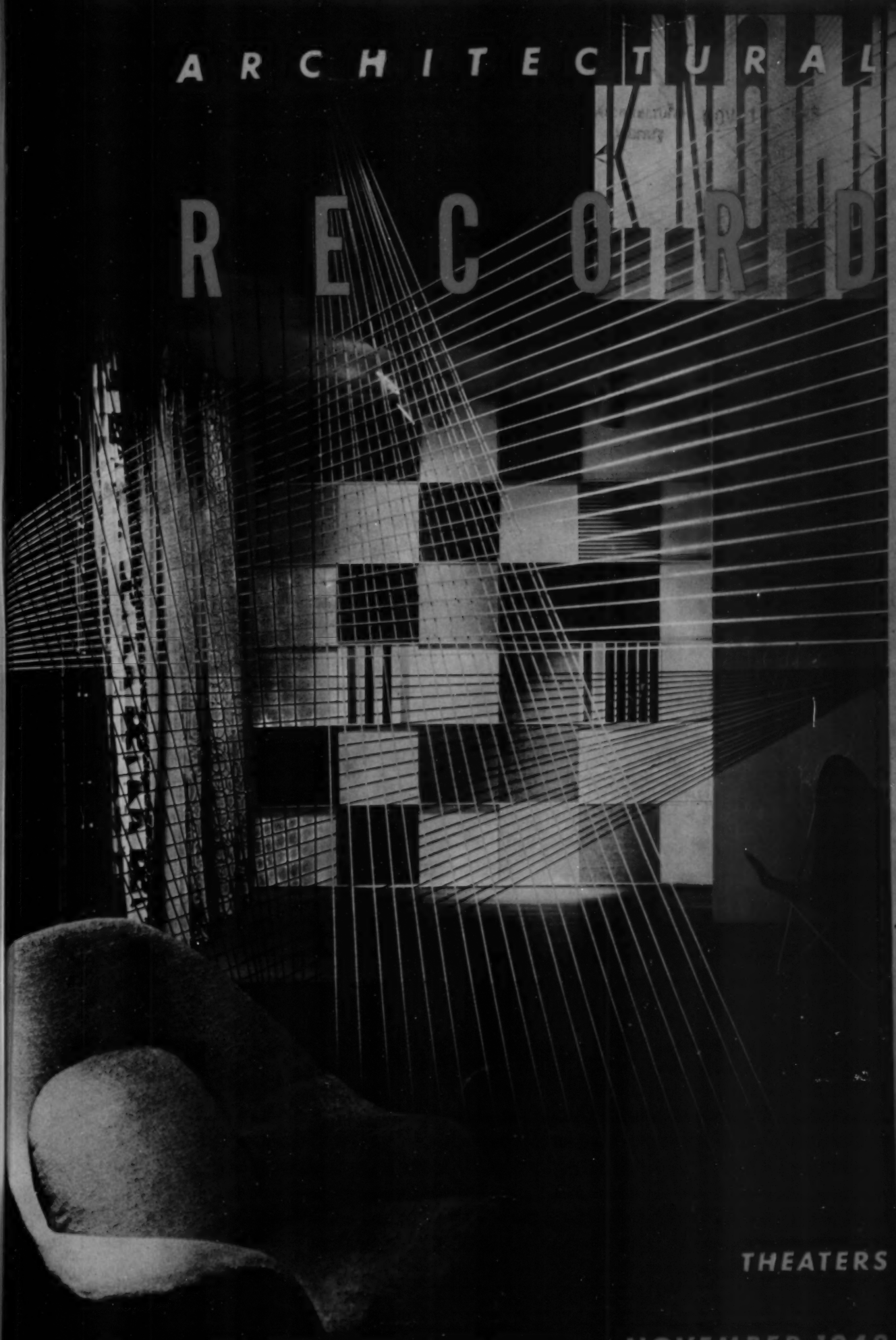
ARCHITECTURAL RECORD



THEATERS

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NOVEMBER 1948

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Entered as second-class matter at the Post Office, Concord, N. H., March 6, 1946, under the Act of March 3, 1879.

ARCHITECTURAL

RECORD

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Architectural Record (combined with American Architect and Architecture) is published monthly by F. W. Dodge Corporation, 10 Ferry St., Concord, N. H., with Editorial and Executive Offices at 119 West 40th Street, New York, N. Y. Western Editorial Office, 2813 Channing Way, Berkeley, Calif. Thomas S. Holden, Pres.; Howard J. Barringer, Vice-Pres. and Treas.; Irving W. Hadsell, Vice-Pres.; Chauncey L. Williams, Vice-Pres.; Sanford D. Stockton, Jr., Secy.; Walter F. De Saix, Asst. Treas.; Edwin H. Freed, Asst. Treas. Member Audit Bureau of Circulation and Associated Business Papers, Inc. Architectural Record is indexed in Reader's Guide, Art Index, Industrial Arts Index and Engineering Index. Subscription rates: United States and Possessions, Canada, Cuba, Mexico, Central and South America, and Spain, $4.50 the year, $7.50 for two years, $9 for three years; elsewhere, $6.50 the year, $11.50 for two years, $15 for three years. Single copy, $1. Circulation Manager: Marshall T. Ginn. Every effort will be made to return material submitted for possible publication (if accompanied by stamped, addressed envelope), but the editors and the corporation will not be responsible for loss or damage. Other Dodge Services: Real Estate Record & Builders' Guide, Sweet's Files, Home Owners' Catalogs, Dodge Reports & Dodge Statistical Research Service.

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THE RECORD REPORTS

Higher GI Interest Rate Fought • Shipping Issues Raised • Housing Picture Centered on Getting More Houses Built at Lower Cost

The special session of Congress had let the Administration raise interest on GI loans from 4 per cent to 4½ per cent. Weeks became months and, still at 4 per cent, volume of GI loan business quietly declined, while the agencies analyzed, debated and reviewed their debates, but did nothing. They were afraid either to act or to say that they wouldn't act. The issues, as sifted by the agencies, were different from their appearance to the public.

The higher rate seemed essential in order to keep the banks happy to take GI business. After all, a good deal of publicity had been given to the idea that interest rates were going up. If so, any banker would think twice before making a long-term investment of his bank's cash. Why not let some of the business go and await the higher returns that seemed to be in prospect?

Higher Rates Fought

But, granting that higher rates would expand volume, the other agencies that have something to say about the matter are not convinced that higher volume now is desirable. The Reserve Board, among others, is fighting the 4 per cent rate. Its arguments are complicated and technical, but important.

The Board would like to force a deflation but, strange as it sounds, feels that higher rates, traditionally the specific for reversing an inflation, instead would feed it. Here's its point. The Board is more or less obligated to supporting the market for long-term government bonds at par. If banks were sure of higher returns on construction business, they would sell their bonds in order to put the proceeds into building. The Reserve Board would have to hold the bag, buying those bonds. This, for technical banking reasons, would greatly expand the bank's lending power, so that the inflation might drive ahead powerfully instead of ebbing.

This suggests that the question of 4 per cent or 4½ per cent is closely tied up with the much broader question of credit policy. If the Reserve Banks decide to let government bond prices drop, it will probably be giving a tip-off on GI loans. A rise in GI interest rates, conversely, will tip the business community as to general credit policy.

Now, the Republican Administration, judging by stray advices coming to Washington, wants to get rid of the present supports for government bonds. If it does, the Administration will be freer to deal with the GI loan question.

Contractors Affected

But the connection between the GI and the general interest rate is by no means the only issue. Again assuming that a rise in the rate would expand volume, agencies question whether that would be desirable now. Wouldn't it put off the squeezing out of marginal contractors and perhaps even invite new ones into the business? Since the amount of available materials and labor is limited, wouldn't that merely bid up prices and wages? Wouldn't more people be getting in each other's way as they scrambled for the services of subcontractors and deliveries from suppliers?

Moreover, the agencies that oppose a higher rate now are not ready to concede the main argument of the proponents: that it would raise volume. Perhaps sincerely, perhaps in order to keep a debate going and thus avoid the day of decision, they raise these points:

1. The banks have been indicating a profound lack of interest in new real estate assets regardless of rates. Many of them feel that their real estate portfolios are simply too high in relation to total assets.

Vet Issue Dwindles

2. The urgency of building for veterans may be less than it was three years ago. Although there are not suitable houses, veterans' living problems have merged into those of the general population. Consequently, the falling off in banks' applications for GI loans guarantees may reflect a drop in demand by the veterans themselves. Veterans no longer take whatever is offered. They are well enough situated to look at prices.

If these possibilities are right, raising interest rates would merely increase the permanent liabilities of veterans. Some of the agencies insist that it isn't worth while.

All this, of course, marks a far change in the point of view of the Administration as to housing. Not long ago, its attitude was that anything and everything should be done to expand construction. Now there is more feeling that it may be better to keep out of things.

Loan Technique Studied

The GI interest question is the hottest before the Administration, but there are other questions too. There are several planks in the law passed this summer. New sections of the housing laws provide for FHA loans to large scale builders. FHA and other interested agencies are doing the natural thing about all this: They aren't precisely looking for business. They are trying to figure out the proper techniques for such loans.

They feel that the customary methods

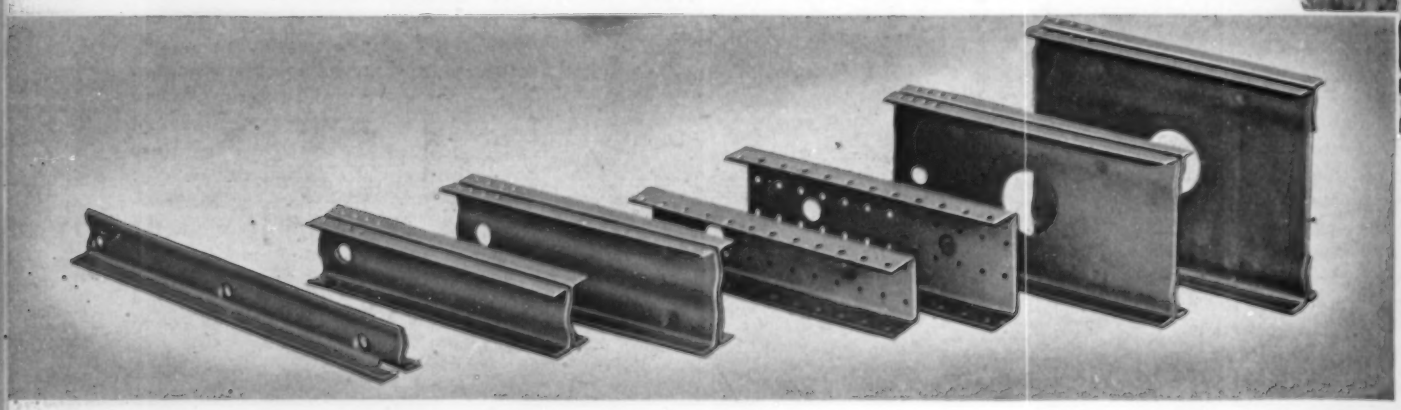
(*Continued on page 10*)

"Just as I feared — our client has a Louis Seize mind in a Louis Sullivan body."

— Drawn for the RECORD by Alan Dunn

"We wanted Uniform High Quality, Economy, Fast Erection, Fire Safety, so we specified STRAN-STEEL FRAMING"

Roberts Construction Corporation
Kent Village, Prince Georges County, Maryland



When the builder plans to retain ownership of a $14,000,000 housing project, he takes particular care to select only the finest materials for its construction. That's why the Roberts Construction Corporation, owners and contractors, and Berla and Abel, architects, specified Stran-Steel nailable framing throughout the first two of nine blocks of buildings in the Kent Village garden-type apartment project now being erected in Prince Georges County, Maryland, near Washington, D. C.

Financially and structurally, the Stran-Steel framing system satisfied most advantageously the requirements of these builders. They wanted—and got from Stran-Steel framing:

Economy of Framing Construction—Stran-Steel framing members correctly engineered to pre-determined quantities and sizes, are shipped to the job to fit exact requirements. This simplifies assembly and eliminates costly, time-consuming cutting on the job. It reduces delays in close-in time to a minimum. The quick completion possible with Stran-Steel nailable framing means early occupancy and consequent early returns on the owner's investment.

Economical Dry-Wall Construction—The patented nailing groove in Stran-Steel framing members permits plaster board to be nailed directly to the framing members, without any danger of subsequent wall movement from warping and shrinking. For when dry wall is applied to a precision-built steel frame, its permanence and stability through the years is assured.

Fire-Safety—The use of incombustible Stran-Steel framing members for floors, walls and roof greatly increases the fire-safety of the completed structure.

Stran-Steel Framing Supplies a Backbone of Steel for Apartments, Residences, Commercial and Industrial Buildings

Stran-Steel nailable framing has a definite place in the modern building picture. Its superiority has been soundly established in a wide variety of structural applications over a period of ten years. And today an increasing number of builders and architects everywhere are adopting the Stran-Steel framing system for quality buildings.

A portion of Kent Village project similar to first two blocks of buildings now under construction. Entire village, when completed, will have 1,600 family units.

Construction view of Stran-Steel framework for first unit, Kent Village Apartments. Roberts Construction Corporation, owner and contractor; Berla and Abel, architects.

For Stran-Steel framing offers advantages unequalled by any other framing material. It's strong. It's fire-safe, rot-proof, termite-proof. The permanently rigid Stran-Steel framework affords protection against plaster cracks, sagging doors, and other damage caused by warping and shrinking. And the enduring quality of a building framed with Stran-Steel members insures lower maintenance costs and greater salability over the years.

Stran-Steel framing is available today. It can help you to build better. It can help you to build faster. Where quality is a consideration, it can help you to build at less cost. So, why not let our engineers show you how satisfactorily Stran-Steel framing can be applied to the job on your drafting board? Ask your local Stran-Steel dealer for full details, or write for his name and address.

Any collateral material can be nailed directly to Stran-Steel framing members. The nail is automatically clinched as it is driven into the patented nailing groove. The holding power of this groove is much stronger than that of wood, yet nails can be easily removed with a claw hammer.

YOU NAIL TO STRAN STEEL FRAMING

GREAT LAKES STEEL CORPORATION

Stran-Steel Division • Dept. 36 • Penobscot Building • Detroit 26, Michigan

UNIT OF NATIONAL STEEL CORPORATION

(*Continued from page 7*)

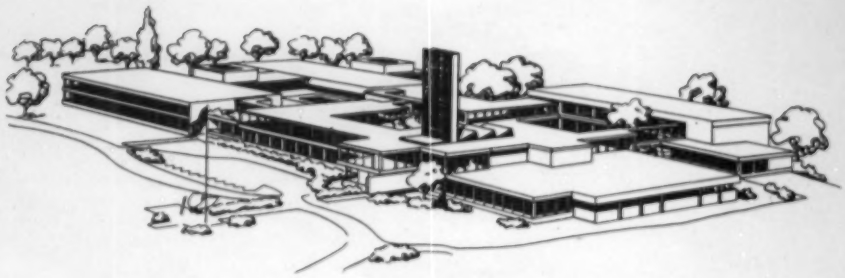
of handling building loans don't apply. To advance small sums at particular stages of construction work might be too complicated. Yet money couldn't be advanced in a single lump sum. Methods of keeping collateral behind the loan advances and the like remain to be worked out. Part of the proceeds may be needed for factory operations not directly entailed in any particular projects so that the usual system won't be used.

Prefab Loans Watched

In addition, the RFC was given specific authority to lend to prefabricators — although under its charter RFC can make practically any loans its board wants to make. The specific authority probably was given in order to tell RFC that such loans are not to be treated like the others — i.e., to be weighed with respect to return, safety, etc., against a loan, say, to a railroad or municipality. That, at any rate, is the interpretation at RFC headquarters. However, there hasn't been much indication yet of actual business.

The agencies also are taking a long look at themselves. Are they correctly set up? One question in this respect is what will happen during the depression

(*Continued on page 12*)



Gruen Watch Company's new plant near Cincinnati will be sealed for climate control

BUILDING NOTES

Watch Factory

Outer walls of sheet glass and an 80-ft. tower housing a giant clock will feature the new climate-controlled, sealed factory to be built for the Gruen Watch Company at Time Hill, Cincinnati.

Designed by Woodie Garber, Cincinnati industrial designer, in collaboration with James E. Allen, architectural engineer, and Oscar A. Freidhoff, associate architect, the building eventually will provide 330,000 sq. ft. of floor space. It will house a horological division, a movement division, a case manufacturing plant, and the company's school for disabled veterans, as well as executive offices, a cafeteria and recreation facilities for employees.

The new plant will be located on a 63-acre site, formerly a golf course, in Amberley Village, a residential area on the outskirts of Cincinnati. Extensive gardening and landscaping are planned to keep the country-club atmosphere.

Wright Homes for Westchester

A cooperative housing development of 50 homes, for which Frank Lloyd Wright is serving as supervising architect, is under construction in Mount Pleasant, Westchester County, N. Y. The project is being erected by Usonia Homes, Inc., a non-profit cooperative affiliated with the Eastern Cooperative League. The houses are custom-designed, will range in cost from $10,000 to $30,000.

The site chosen for the development is 97 acres of rolling wooded land overlooking the north end of the Kensico Reservoir. The site plan was prepared by Mr. Wright, and provides 55 circular building plots enclosing approximately an acre each. Only 50 of the plots are

(*Continued on page 170*)

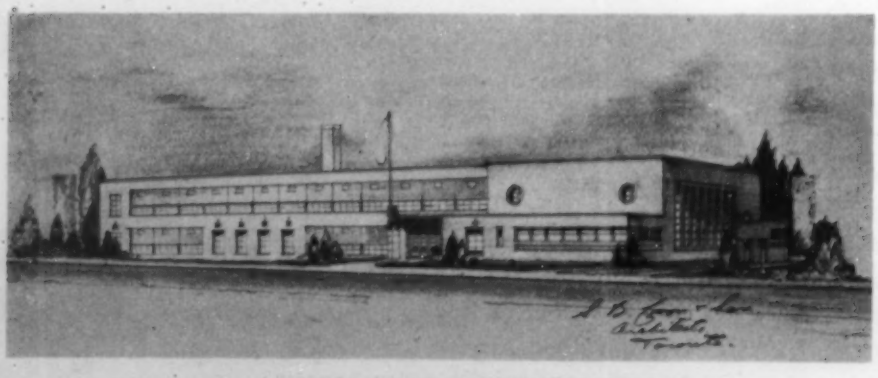
NEWS FROM CANADA By John Caulfield Smith

Industry Fails Architecture?

"Can our readers," asks Professor E. R. Arthur in an editorial in the August *Journal, Royal Architectural Institute of Canada*, "think of anything cheaper than the bearing wall of our ancestors, strapped, lathed, plastered and painted — where brick is laid on brick? We tried a new prefabricated wall material recently only to find that its cost was 50 per cent higher. . . ."

Prof. Arthur claims that one of the big postwar surprises has been the failure of industry to produce new and exciting materials to reduce building costs. He goes on to say: "We would give high marks for ingenuity to the makers of directional glass blocks, striated plywood and armor plastics, but they are not of universal application. The new architecture is unfortunately years in advance of the industrial development which will permit its full realization."

Would anyone have foreseen, Prof. Arthur asks, that in 1948 we would be building urban restaurants and shops in rugged stone and unvarnished timber? That the Canadian government would be intrigued with the possibility of erecting houses of mud? That we'd have reverted to the pioneer practice of using waste lumber set in mortar for walls? "We wonder," he concludes, "whether industry knows what our modern building requirements are. The bulk of our materials go back to the dawn of architecture. . . ."



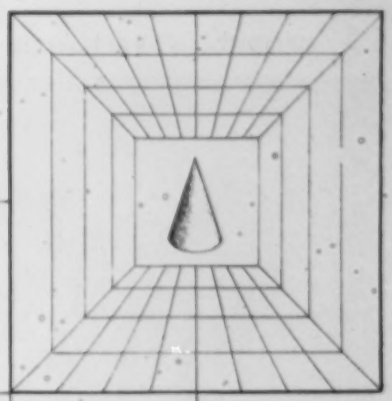
Proposed high school at Huntsville, Ont.; S. B. Coon and Son, Architects. Plans call for a two-story reinforced concrete building with brick and tile walls, felt and gravel roof

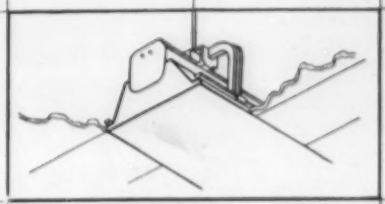
Architectural Competition

Clarence Campbell, president of the National Hockey League, announces that the League will conduct an architectural competition for the design of an international hockey hall of fame to be erected in Kingston, Ontario. Further particulars will be available from the Secretary, Royal Architectural Institute of Canada, 1323 Bay St., Toronto.

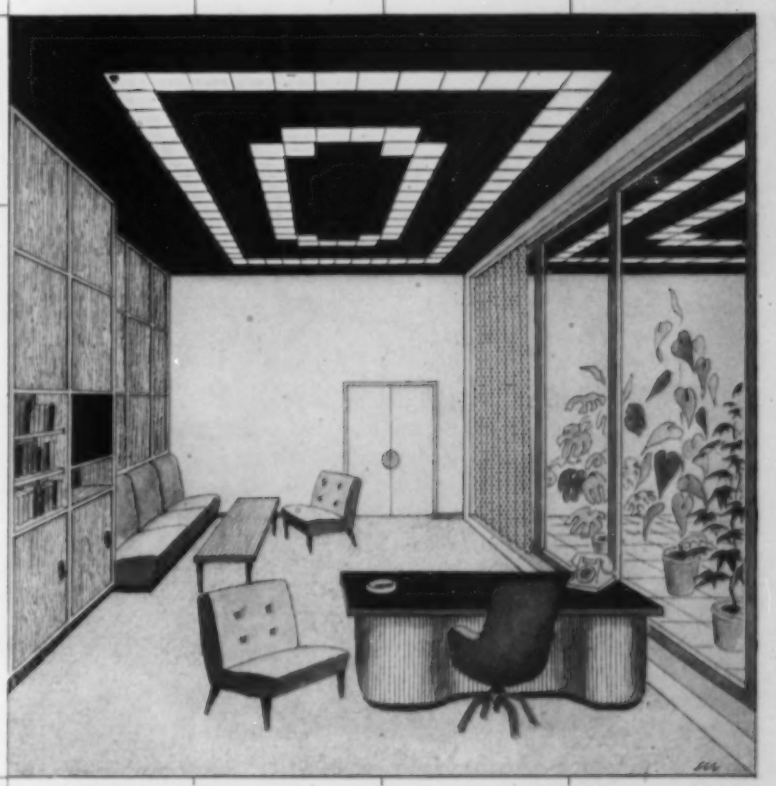
(*Continued on page 162*)

Light, installed in the ceiling pattern desired ... CEILINGS UNLIMITED*





Miller Ceiling Furring Hanger (patented) simplifies installation. Continuous wireway cuts wiring and fitting costs. Units are Bonderized, rust-resistant. Accessible parts make for easy service.



Executive office — Architect: Susanne Wasson-Tucker, New York

One system ... the Miller Fluorescent Troffer Lighting System ... provides light, PLUS a boundless opportunity to use the light units as building blocks ... in new construction or relighting ... to create architecturally harmonious ceiling patterns ... CEILINGS UNLIMITED.

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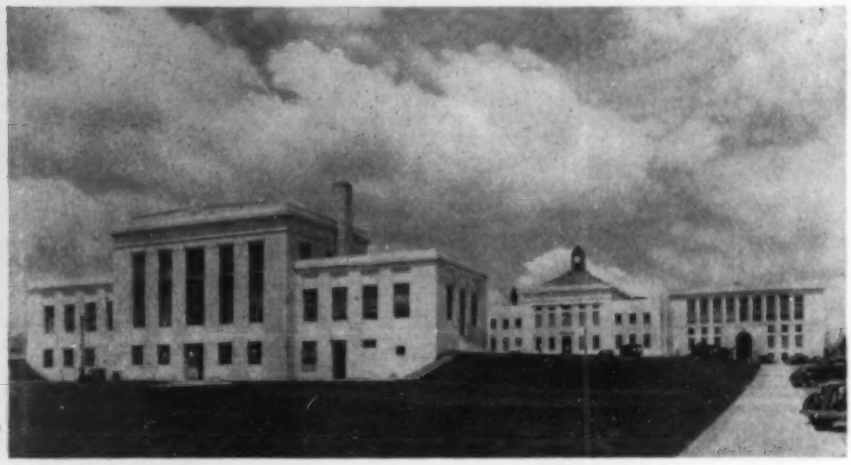
6

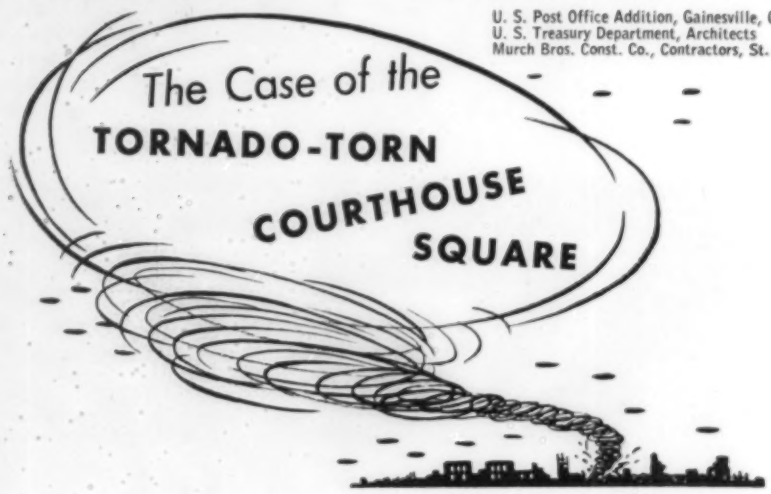
GEORGIA MARBLE—THE MODERN BUILDING MATERIAL



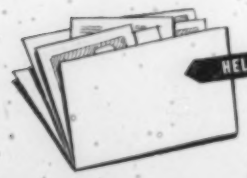
City Hall, Gainesville, Ga.
Daniell & Beutell, Architects, Atlanta, Ga.
Works Progress Administration, Contractors

Hall County Courthouse, Gainesville, Ga.
Daniell & Beutell, Architects, Atlanta, Ga.
Mion Construction Co., Contractors, Atlanta, Ga.

U. S. Post Office Addition, Gainesville, Ga.
U. S. Treasury Department, Architects
Murch Bros. Const. Co., Contractors, St. Louis, Mo.



The raging tornado of 1936 demolished Hall County's old brick courthouse and damaged other public buildings, but it could not crush the spirit of the people. The magnificent new Georgia Marble structure (center) stands as a monument to their courage. Flanked by Gainesville's City Hall and the U.S. Post Office Annex, also constructed of Georgia Marble, it is a striking example of how "the Marble with the Sparkling Crystal" enhances the beauty and dignity of the community.



Considering a project incorporating marble? Write to our nearest sales and service office stating the type of building. You will receive a specially prepared file containing detail sheets and other information that will be both interesting and valuable.

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THE RECORD REPORTS

(*Continued from page 10*)

when foreclosures become commonplaces. Under the present set-up, both FHA and VA financed loans will be dealt with differently. This would obviously invite invidious comparisons between the techniques of the two agencies, whether from the point of view of owners or of lenders. Nobody cherishes the prospect. There are plans of all kinds for joint, or at least similar, handling of distress situations. Any plan of the kind, however, is likely to step upon some official toe.

FHA-VA Problems

The same situation arises with respect to the old issue — unifying FHA and VA operations generally. The Budget Bureau seems still to be at it. Veterans Administration, it is to be gathered, wants to keep what it has. FHA wants to be a sound business institution, as before the war, and is timid of getting mixed up more than it has to with postwar additions to the older laws. One outcome, evidently being suggested by the Budget Bureau, is for FHA to compromise what it conceives to be sound financed principles in order to get a continually larger share of the business. This would avoid too sharp a dichotomy between the two government systems.

Shipping Issues Raised

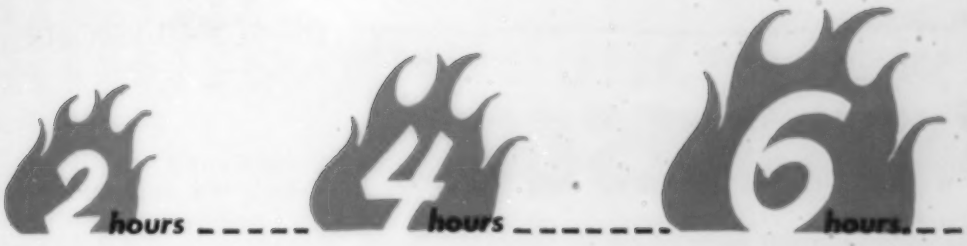
Naturally, the building industry will be among the first to be affected by changes in law with respect to the pricing of shipped materials. Cement and steel, under the Cement Decision, must now be priced f.o.b. mill instead of f.o.b. nearest basing point as in the past. The Capehart Committee will introduce a bill early in the next session to modify the law, as interpreted in the latest court decisions and FTC orders.

The most likely change, staff members think, will be to make it harder to prove conspiracy. For example, the fact of uniform prices alone may become insufficient as evidence; the positive evidence of known collusive acts by companies may be required as well. The Committee probably will change the law as little as possible since it can't foretell the detailed results of any new law. One idea is to get the law back to what it was just before the Cement Decision and then, continuing the Committee's existence, to go on with further studies of the anti-trust laws.

Puzzles Cleared Up

In a survey of what families can afford to spend for housing, the Federal Reserve Board confirmed what people

(*Continued on page 14*)



HHM Double Door VAULT ENTRANCES provide the required degree of CERTIFIED PROTECTION for valuable records

Extra Margins of **SAFETY!**

RELOCKING DEVICE! Extra safety feature that automatically locks the bolts when forced entry is attempted. Lower burglary insurance rates 10%.

ESCAPE DEVICE! A life and death necessity that enables anyone locked in the vault to get out easily and quickly.

Herring-Hall-Marvin insulated flat sill *double door* vault entrances give you the choice of any degree of certified fire protection . . . plus the extra convenience of a wider entrance, full 42″ clearance for easier movement of record buses and trucks.

To help you decide the type of equipment needed for any particular job, call in a Herring-Hall-Marvin representative, a specialist in this field.

Without obligation, he will survey your client's needs and make a detailed recommendation to you.

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See our catalogue $\frac{25}{2}$ in your Sweet's File for detailed information on certified vault entrances and installation.

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OTHER AGENCIES ALL OVER THE WORLD.

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Protected by Onan Standby Power

Edgar Shaeffer, Manager, Roxy Theatre, with Onan Standby System. Plant runs on natural gas.

Power failures are costly to theatre operators. Refunds must be made to disappointed patrons, and there's always the possibility of panic in the darkened theatre.

Protect your theatre projects by specifying a low-cost Onan Standby System. The generating plant starts automatically when commercial power fails, takes over the power load without interruption, stops automatically when commercial power is restored. Shipped complete, ready to run. Easy to install . . . requires little space. Capacities up to 35,000 watts.

Model 10EL
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Approved by the Pennsylvania Industrial Board for standby installations

Write for folder

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Onan PRODUCTS

ONAN STANDBY POWER

THE RECORD REPORTS

(*Continued from page 12*)

probably took for granted before: that home ownership is related to income brackets, to the age of the head of the family, etc. Of families with less than $3000 a year, two out of five are home owners; in the $7500 and over class three out of four own their homes. In 1947, the Board estimates, home owners spent almost $5 billion for improvements. The figure clears up some puzzles. For a long time, Commerce Department figures on the volume of shipments of particular building components have been too high in comparison to building volume. The high repair and improvement figure brings other statistics into better alignment.

Commerce reports that physical output of key materials is still on the upgrade. Gains include lumber, hardwood flooring, brick, cement, concrete reinforcing bars, clay tile and gypsum board and lath.

Aluminum Lack Noted

Companies putting out built in fixtures requiring aluminum, such as metal for refrigerator ice-trays, are having supply trouble — which may get worse. Government is using substantial amounts of aluminum in its aircraft program and may embark on a shipbuilding program that will use up still more. Meanwhile, the metal has gotten itself well intrenched as a substitute for other materials.

Industrial construction remains high. Interested agencies expect the volume to remain at its present level at least for half a year. The utilities especially are expanding as they must.

One development looking toward large-scale home construction projects is the mushrooming of co-ops. The Labor Department reports that many projects are under way. Cooperators seem to be more interested in suburban single-family house developments than in the prewar type of cooperative apartment.

Bank Problems Grow

The Senators who drafted the additions to housing legislation this summer are well aware that nothing works. Their bill was intended to put more money into building. But the banks are more interested just now in getting some of their money out. In this they are backed by the examiners. Federal Deposit Insurance Corporation, the Federal Reserve Board and local examiners are joined in telling the bankers that real estate can become too much of a good thing.

For months the banks have been

(*Continued on page 16*)

CORNING ANNOUNCES NEW SERVICES

to help you solve any commercial lightingware problem!

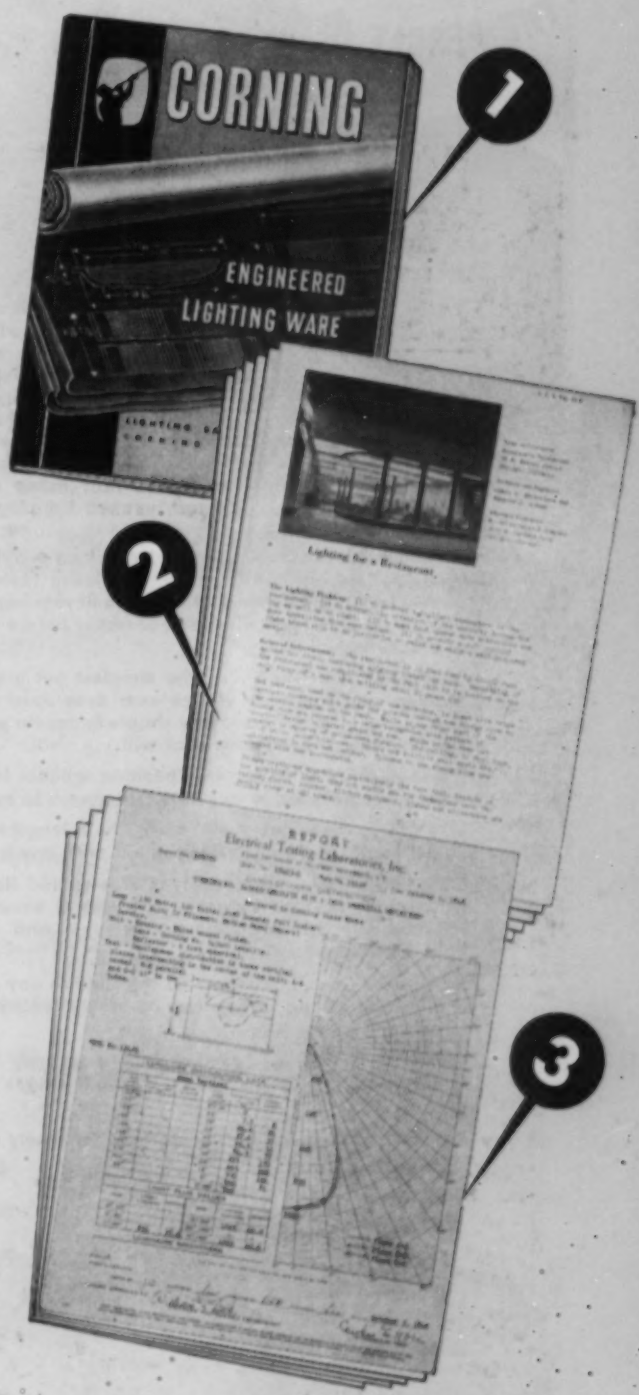
Corning Glass now offers a completely balanced line of commercial lightingware for diffusion and prismatic light control from fluorescent and incandescent light sources. This lightingware is the product of extensive research and is made to high standards of quality and tolerance.

To help you use this lighting effectively, Corning now offers many new services which are available for the asking. Whether you are an architect, lighting engineer, or fixture manufacturer, be sure you have this information in your files:

1. Bulletin LS-17, "Corning Engineered Lightingware," just published, describes and shows you how to use Corning's completely balanced line of lightingware to best advantage. It is a condensed handbook that will save you valuable time.

2. Installation data sheets conforming to the standards of the Illuminating Engineering Society are available on outstanding commercial installations, schools, stores, and institutions. They help you to plan.

3. Electrical Testing Laboratory curves have now been completed for the new Corning curved lens panels, the flat lens panels, and some of the Lenslites. You will find them valuable when planning a prismatic installation.



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☐ Installation data sheets ☐ ETL curves

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THE RESULT OF RESEARCH BEHIND THE CEILING LINE!

Years of experience in the lighting field — years of working closely with the men who actually install lighting fixtures — have given Smithcraft engineers a thorough insight into installation and maintenance problems. This combined experience plus exhaustive research has resulted in the *exclusive* features found only in Smithcraft Troffers, features that mean direct savings in installation and maintenance time and cost.

ALIGNER HANGER* . . . requires no exact positioning for installation . . . housing snaps on with no loose fastening devices . . . allows lateral adjustment of troffer to fit requirements of ceiling . . . permits up and down elevation of troffer *before or after installation has been completed.*

DUO-CAM HANGER* . . . the simplest yet most effective louver hinging and fastening device ever developed . . . hinges or releases louver at either side by simple finger-tip pressure . . . permits complete removal of louver at will.

REFLECTORS . . . fasten into position without loose parts . . . top reflector removable *at any time* for access to ballasts and wiring.

LOUVER . . . introduces 40° cut-off both lengthwise and crosswise . . . provides even light distribution with low brightness.

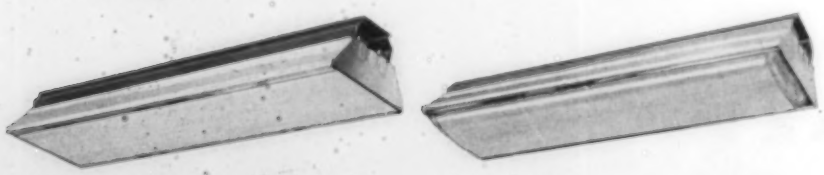
CONSTRUCTION . . . electrolytic zinc-coated Bonderized steel for trouble-free lifetime service . . . troffer is exactly 12″ wide to fit requirements of san-acoustic ceilings and permit maximum light output.

VERSATILITY . . . troffer can be installed in *any* type of ceiling . . . if required, ceiling panels can be supported by framing attached to troffer.

GLASS TROFFERS . . . glass is locked securely in metal envelope without clips or fastenings . . . frame hinges and snaps closed easily.

For ease of installation and maintenance, for beauty of appearance, there is no equal to the Smithcraft Troffer.

*pat. pend.



For complete information address Dept. 500.

Smithcraft
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CHELSEA 50, MASSACHUSETTS

In Canada, address inquiries to:
LIGHTING AND LAMPS LTD., 425 RIVER ST., MONTREAL, QUEBEC.

THE RECORD REPORTS

(*Continued from page 14*)

slowly increasing the amounts of down-payment they require, whether on new construction or on old. When a house is transferred nowadays, the amount of the mortgage is not expected to increase. Already this has had some effect, the banking authorities say, on the market. Naturally, it affects mortgage policy on new construction.

Senator McCarthy of Wisconsin, vice chairman of the Joint Congressional Committee on Housing, has been trying to persuade the bankers to change their minds. He told the annual convention of the Mortgage Bankers of America recently that Congress will put the government more actively into the business if they persist in demanding higher down payments. The bankers have not been using the mortgage insurance provided by the 1948 law, which McCarthy helped to write.

If Congress does do what the Senator says it will — create a readier government credit — it will have to deal with a group of reluctant agencies. Most of them are nervous and want to expand committees as slowly as they can. A Congressional committee taking testimony from the Administrative side on a bill to expand federal banking operations would have to deal with negative advice from the Administrative side. A change in the political question of the Administration is hardly likely to alter this.

Public Housing Unsettled

Meanwhile, it appears that public housing will be an issue in the 1949 Congress, as it was in this year's. The local housing authority administrators are preparing a new bill, for sponsorship of which they look to those who promoted the T-E-W bill. The measure, which first was to have included construction for middle-income families, evidently will confine itself to building for the poorest classes. To propose more would mean too much fighting.

Judging by what Congressmen in Washington say, public housing proposals in 1949 should have the same fate as in 1948. Passing through the Senate should be pretty easy. On the other hand, Representatives feel now just as they felt a few months ago. Nothing has happened to make them think or talk differently.

Housing Attacked

The Washington centennial celebration of the American Association for the Advancement of Science heard considerable derogation of the housing industry.

(*Continued on page 18*)

ROSLYN GARDENS, ROSLYN, L. I.
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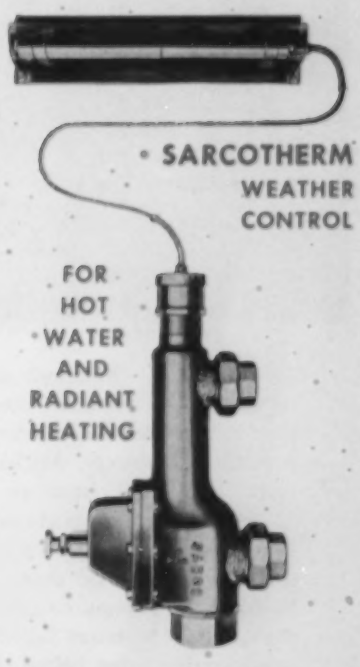
Another BIG APARTMENT PROJECT SELECTS SARCOTHERM

Simplified Heat Control



The engineers of this six acre F.H.A. development, providing 217 moderate priced apartments, assured utmost heating comfort by deciding on Sarcotherm Control for the forced hot water system.

"Simplicity and Low Cost" were again the deciding factors. More and more engineers are realizing that the luxury of a control that modulates for both outside and inside temperatures is also an economy—in first cost, in fuel, and in maintenance costs.

Sarcotherm has thrived on comparisons. On plans, on price, in service, the more you compare, the better Sarcotherm looks. Why not see some of the many jobs in your territory?

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Michaels

STORE FRONTS

Michaels store fronts, push bars, kick plates and thresholds of extruded bronze, aluminum, stainless steel and other metals meet virtually every requirement. Many stock designs are available. However, Michaels is set up to faithfully reproduce in metal the most intricate creations of discriminating architects. Michaels store fronts are unusually attractive and inviting. Specially designed metal letters of harmonizing or contrasting colors add to the effectiveness of these modern store fronts. ¶Architects and builders are invited to consult us on all their requirements for ferrous and nonferrous building products. A partial list of Michaels products is shown below. If this list does not include the product you need, write us. Chances are we have it or can make it. Complete information on any or all products will be sent on request.

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Stair Railings (cast and wrought)
Wrought and Cast Radiator Grilles
Grilles and Wickets
Kick and Push Plates
Push Bars
Cast Thresholds
Extruded Thresholds
MI-CO Parking Meters
Museum Trophy Cases

The MICHAELS ART BRONZE Co., Inc., 234 Scott St., Covington, Ky.

Member of the National Association of Ornamental Nonferrous Metals Manufacturers

★

THE RECORD REPORTS

(*Continued from page 16*)

as it exists. For example, Livingston W. Houston:

"One of the greatest stumbling blocks to housing progress lies in the field of architectural expression. An important principle of esthetics, the science of beauty, confirmed by the science of history, states that always and everywhere, great architectural styles have logically reflected the spirit of their own age — in the use of materials, manner of erection, and in the design of architectural forms. Today, in direct violation of that principle, homes are being built by the hundreds of thousands, imitating the forms and fabrication techniques of hundreds of years ago. Imagine the state of civilization today if, in all other phases of human activity, this tendency to reproduce the past were as strong as in housing. And buildings, on good historical and sociological authority, may be rated as man's most important artifacts!

"Some very obvious ideas result from an examination of the findings of physical science in the light of political science. There is great need to improve the character of such legislation as zoning ordinances, land subdivision regulations, and, in particular, building codes.

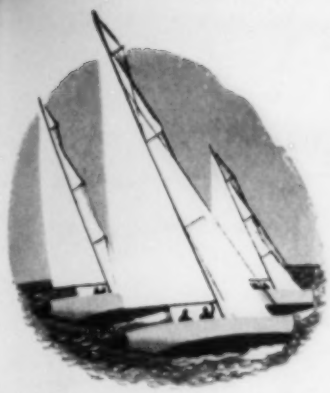
"The construction of housing has long been a local activity and each locality has its own accumulation of regulations. There are approximately two thousand widely varying local building codes in this country. Each of them is a separate and distinct barrier to the manufacturer who wishes to market factory-built units for dwellings on a nation-wide basis. While physical science, for example, can demonstrate beyond question that a given structural material has certain load-bearing or fire-resisting properties, these findings can be, and often are, ignored in antiquated and inhibitory building regulations."

Housing Ignored in Campaigns

Housing and other construction issues were receiving very little attention as Mr. Truman and Mr. Dewey fanned their campaigns to white heat in the last weeks before elections. The President made mention a few times of the failure of the eightieth Congress to pass a comprehensive long range housing program. But Dewey seemed content to rest on his record of housing achievements in New York State during his stewardship as Governor.

Foreign developments overshadowed domestic happenings. The Munitions Board had announced its first batch of "stand-by" orders, rounding up an in-

(*Continued on page 20*)



extra white . . . a favorite on land or sea

extra whiteness —for mass or contrast in architecture

Trinity White—the *whitest* white cement—is made to ASTM and Federal specifications. It is a true portland cement made from selected raw materials. It has all the excellent portland cement qualities of strength, endurance and workability.

Use Trinity by itself for whiteness—with pigments for purer, truer color values. Use it in cast stone, architectural concrete units, terrazzo, stucco, light-reflecting floors; in cement paint. Trinity Division, General Portland Cement Co., 111 W. Monroe St., Chicago; Republic Bank Bldg., Dallas; 816 W. 5th St., Los Angeles.

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Trinity White Portland Cement plain or waterproofed

TO HELP YOU PLAN YOUR NEXT BUILDING

– this new catalog shows you how to do it faster, easier, and at Lower Cost

WHAT ARE LURIA BUILDINGS?

They are *permanent*, steel-frame structures, designed to meet the most exacting building codes – available with clear spans of 40 to 100 feet, eave heights of 12 to 20 feet, and lengths in increments of 20 feet.

WHERE CAN THEY BE USED?

There's practically no limit to their application. They can be used singly or in any desired combination – with a wide choice of door and window locations, optional features, roofing and siding materials. These Standard Buildings are so flexible that they can, in effect, be custom-tailored to meet your precise requirements.

WHY DO THEY COST LESS?

Because (1) they are produced in quantity; (2) they use fewer and heavier members which require less fabrication; (3) they are designed to permit maximum interchangeability of parts throughout the entire line.

WHEN ARE THEY AVAILABLE?

Now—for fast delivery. Many sizes are carried in stock and can be shipped immediately.

This 20-page catalog, containing data and specifications on the complete Luria line, will be a valuable addition to *your* files. For here is a new and flexible medium to work with – *permanent* structures that can be incorporated into your plans with complete confidence – low in cost, readily available, easy to erect.

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THE RECORD REPORTS

(*Continued from page 18*)

ventory of machine tools, and even the State Department announcement of increased shipments of iron and steel scrap from Western Germany to American steel mills fitted into this pattern of concentration on foreign affairs.

More Houses at Lower Cost

What activity there was concerning housing centered on a cooperative effort by industry and government to create more houses at lower prices. Industry claimed it was making good progress in this direction. Government said what the country needed most was wide-scale production of a good $6000 house.

This was the picture:

The National Association of Home Builders, emphasizing the standardization of building products, pushed the development of less expensive homes. This began to look like a partial answer to the high cost of housing problem. For example, so-called minimum type dwellings have been erected in southern and southwestern areas for low-income families. These have sold for as little as $100 down and $29 in monthly payments. This and the "economy house" have been developed in the drive to place good quality housing on the market at costs well below the corresponding market area prices.

In telling this story to material producers, Carl G. Lane, director of NAHB's Technical Service Department, listed the following methods whereby successful production of the lower priced houses has been achieved:

1. Site fabrications of parts of the houses.
2. Assembly of houses by sections.
3. Standardization of parts.
4. Use of labor saving methods and materials.
5. Careful engineering layout of project operations.
6. Use of trained work crews.
7. Careful attention to project size.

The references are to multiple individual one-family construction on the larger scale.

Said Lans: "So far, we have made enormous strides in a short time in construction techniques. Today's building methods are utterly unlike those used even 20 years ago and are certainly a long way from the so-called old fashioned methods of building piece by piece by hand."

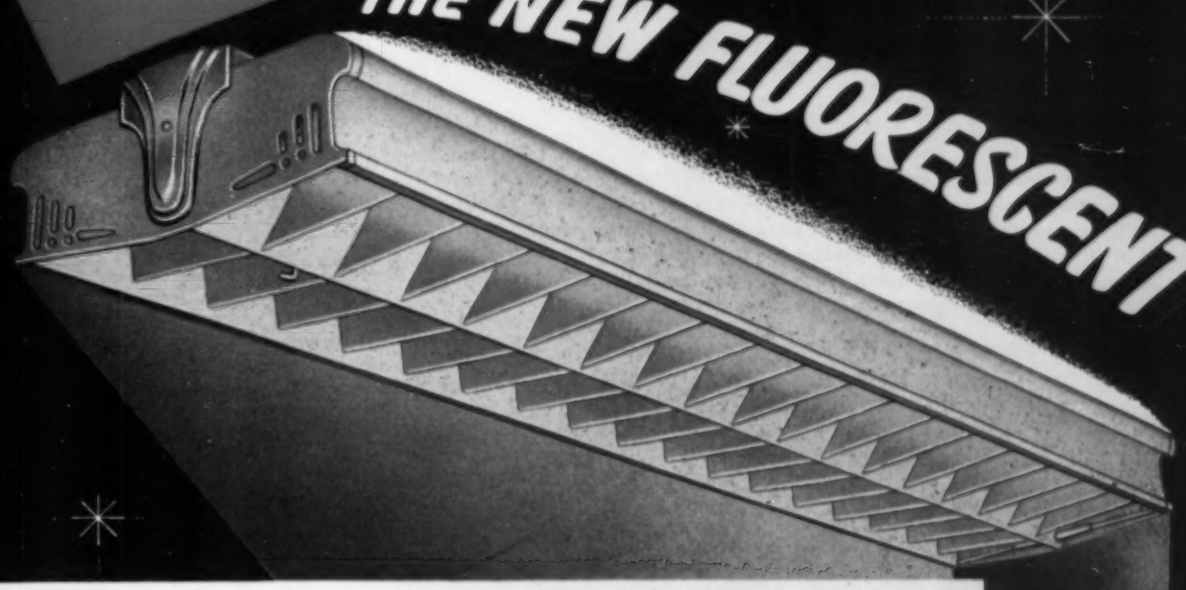
National Conference Urged

But industry never can afford to rest on its accomplishments, heartening as these may be. So, to advance the steps

(*Continued on page 22*)

Guthlite*

THE NEW FLUORESCENT



with a RADIANT personality!

GUTHLITE, the Radiant Glow Fluorescent, is a beautiful luminaire to see — and to see by! When illuminated, it has a soft luminous appearance that is most appealing. This glowing effect is produced with a low surface brightness that is eye-pleasing!

The GUTHLITE provides efficient downlight plus a component of indirect light. This combination creates ideal sight conditions. The light is uniformly distributed; ceiling areas are comfortable to the eye; ample levels of shadowless illumination are supplied at seeing levels!

The high quality, eye-easy illumination of the GUTHLITE is accomplished without glass or plastic panels. The GUTHLITE is all-metal construction, so there is no danger of warping or breakage. The luminous glow of the GUTHLITE is produced by side and spill-lighting.

In addition to beautiful, efficient illumination, GUTHLITES offer many exclusive features that cut maintenance and installation. You should know the many ways in which these features can benefit you. Write for Bulletin 8845C

The light charts illustrate graphically the unusually fine lighting qualities of GUTHLITE.

THE EDWIN F. GUTH CO. . . ST. LOUIS 3

LEADERS IN LIGHTING SINCE 1902

*Trade Mark. U. S. & Can. Pats. Applied For

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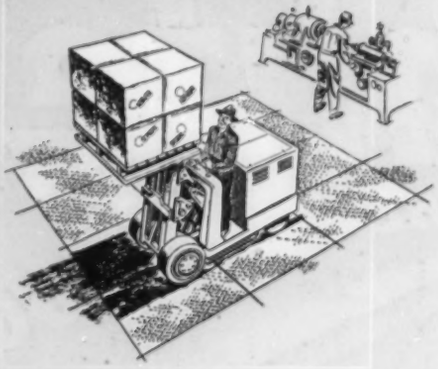
HOW TO – Eliminate Slipping Accidents
In YOUR Plant . . . On YOUR Products



Slipping accidents cost industry thousands of dollars and hundreds and hundreds of man-hours each year. Today it is important to reduce costs and to get maximum production. AW Super-Diamond Floor Plate helps you to do this in three ways: 1. It prevents men from slipping. Wet or dry it grips without a slip. 2. Heavy traffic, oil, heat and fire do not damage it. Therefore maintenance costs are eliminated completely. 3. It is easy to clean (water drains and dries quickly from the exclusive AW Super-Diamond Pattern), and it's easy to match. AW Super-Diamond Floor Plate has over 1001 uses in plants, and on products such as saddle tanks, lift-trucks, machine bases, etc. Do as leading Architects and Designers do and specify AW Super-Diamond Floor Plate . . . for your plant and products.

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A Product of **ALAN WOOD STEEL COMPANY**

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THE RECORD REPORTS

(*Continued from page 20*)

already taken toward standardization of building products and equipment, Lans proposed that a national conference be called in Washington to coordinate the present efforts of manufacturers. The home builders believe that construction savings can be effected, that reduced home building costs will follow increased standardization of house parts and equipment.

(It even has been suggested seriously that the new consumer credit controls added to an indicated trend might result in the equipping of new houses offered for sale with more and more appliances; clothes washers, dish washers, and other large items that low-income families no longer can afford to buy on time.)

Government's case for lower-cost housing was stated succinctly by Raymond M. Foley, Housing and Home Finance Agency administrator, in his call for "wide-scale production of a good $6000 house." This was the first time any federal government spokesman had gone on record with a dollar figure indicating a desired price bracket. Foley said in support that half of all U. S. families have an income of less than $3000 a year and cannot well afford to pay more than $6000 for their houses. The same sale price of $6000 was applied to the value of homes built for rental purposes, the administrator contending that families in the $3000 income class should not be compelled to pay rents higher than needed to finance the $6000-per-home cost figure.

Little Low-Cost Housing Being Built

But little new housing is being built anywhere to sell below $9000; most of it in northern areas, at least, going for $10,000 and up. This fact reaches to the very nub of the housing problem.

New financing arrangements and other incentives legislated by Congress in August are expected to show their worth within the coming months by pulling down home building costs somewhat. Mr. Foley has informed the building field that his agency, HHFA, has as one of its major objectives active cooperation with industry in expansion of research for improvement of construction techniques and the lowering of housing costs. Without particularizing too much, the agency chief stated:

"The index of housing costs has moved upward since the beginning of the war. In most areas the upward trend has not yet stopped. It is not probable nor desirable that labor rates

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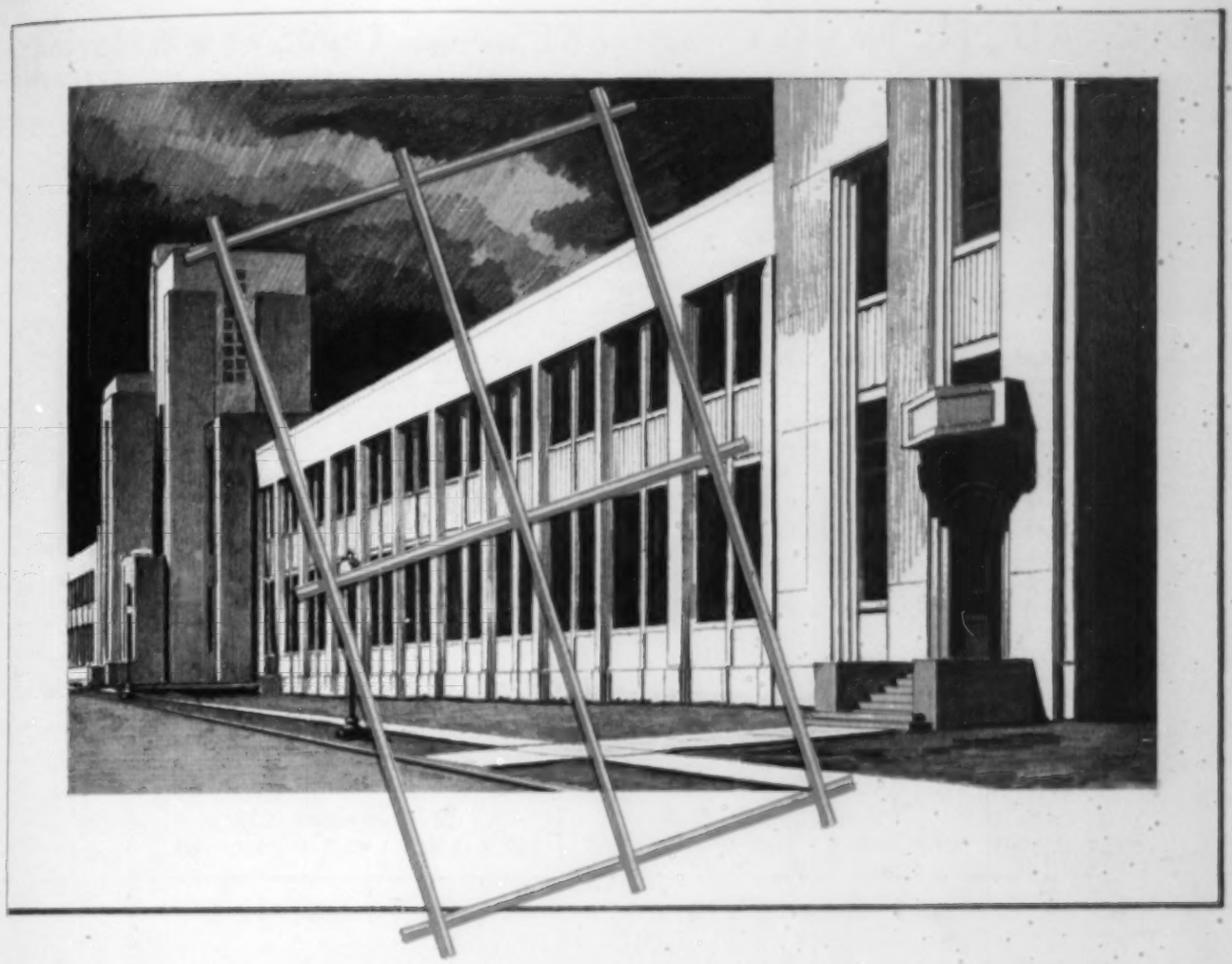

For pre-cast concrete building units

specify American Welded Wire Fabric reinforcement

Many shapes and forms of pre-cast concrete building units are made practical by American Welded Wire Fabric reinforcement. Its closely spaced small members of cold drawn high yield-point steel impart evenly distributed strength to the concrete slabs, panels, planks, pipes and special shapes produced by the pre-casting industry.

In many prominent hospitals, hotels, schools, churches, factories, government and public buildings, the use of pre-cast concrete units reinforced with American Welded Wire Fabric—especially for walls, floors and roofs—has resulted in better-looking buildings, speedier construction, savings in time and money.

We do not produce pre-cast concrete units. When you are figuring on using them, you can get complete information from nearby pre-casting companies—and be sure to specify the use of American Welded Wire Fabric reinforcement.

AMERICAN STEEL & WIRE COMPANY, GENERAL OFFICES: CLEVELAND, OHIO
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Every type of concrete construction needs

USS **AMERICAN WELDED WIRE FABRIC** *reinforcement*

UNITED STATES STEEL

CONSTRUCTION COST INDEXES — Labor and Materials

United States average 1926—1929 = 100

Presented by Clyde Shute, manager, Statistical and Research Division, F. W. Dodge Corporation, from data compiled by E. H. Boeckh & Associates, Inc.

NEW YORK

Period	Residential Brick	Residential Frame	Apts., Hotels, Office Bldgs. Brick and Concr.	Commercial and Factory Buildings Brick and Concr.	Commercial and Factory Buildings Brick and Steel
1920	136.1	136.9	123.3	123.6	122.6
1925	121.5	122.8	111.4	113.3	110.3
1930	127.0	126.7	124.1	128.0	123.6
1935	93.8	91.3	104.7	108.5	105.5
1939	123.5	122.4	130.7	133.4	130.1
1940	126.3	125.1	132.2	135.1	131.4
1941	134.5	135.1	135.1	137.2	134.5
1942	139.1	140.7	137.9	139.3	137.1
1943	142.5	144.5	140.2	141.7	139.0
1944	153.1	154.3	149.6	152.6	149.6
1945	160.5	161.7	156.3	158.0	155.4
1946	181.8	182.4	177.2	179.0	174.8
1947	219.3	222.0	207.6	207.5	203.8
June 1948	249.5	251.8	237.4	239.5	234.7
July 1948	252.4	253.6	241.2	245.1	237.4
Aug. 1948	255.5	256.4	246.1	250.2	244.2
	% increase over 1939				
Aug. 1948	**106.9**	**109.5**	**88.3**	**87.6**	**87.7**

ATLANTA

Period	Residential Brick	Residential Frame	Apts., Hotels, Office Bldgs. Brick and Concr.	Commercial and Factory Buildings Brick and Concr.	Commercial and Factory Buildings Brick and Steel
1920	122.8	122.9	108.6	109.8	105.7
1925	86.4	85.0	88.6	92.5	83.4
1930	82.1	80.9	84.5	86.1	83.6
1935	72.3	67.9	84.0	87.1	85.1
1939	86.3	83.1	95.1	97.4	94.7
1940	91.0	89.0	96.9	98.5	97.5
1941	97.5	96.1	99.9	101.4	100.8
1942	102.8	102.5	104.4	104.9	105.1
1943	109.2	109.8	108.5	108.1	108.7
1944	123.2	124.5	117.3	117.2	118.2
1945	132.1	133.9	123.2	122.8	123.3
1946	148.1	149.2	136.8	136.4	135.1
1947	180.4	184.0	158.1	157.1	158.0
June 1948	196.4	199.9	173.9	175.5	175.5
July 1948	203.4	206.8	182.5	181.6	180.9
Aug. 1948	204.8	208.2	184.7	183.8	183.2
	% increase over 1939				
Aug. 1948	**137.3**	**150.5**	**93.7**	**88.7**	**93.5**

ST. LOUIS

Period	Residential Brick	Residential Frame	Apts., Hotels, Office Bldgs. Brick and Concr.	Commercial and Factory Buildings Brick and Concr.	Commercial and Factory Buildings Brick and Steel
1920	118.1	121.1	112.1	110.7	113.1
1925	118.6	118.4	116.3	118.1	114.4
1930	108.9	108.3	112.4	115.3	111.3
1935	95.1	90.1	104.1	108.3	105.4
1939	110.2	107.0	118.7	119.8	119.0
1940	112.6	110.1	119.3	120.3	119.4
1941	118.8	118.0	121.2	121.7	122.2
1942	124.5	123.3	126.9	128.6	126.9
1943	128.2	126.4	131.2	133.3	130.3
1944	138.4	138.4	135.7	136.7	136.6
1945	152.8	152.3	146.2	148.5	145.6
1946	167.1	167.4	159.1	161.1	158.1
1947	202.4	203.8	183.9	184.2	184.0
June 1948	230.0	234.2	208.7	210.7	209.0
July 1948	231.3	235.5	210.4	211.3	209.6
Aug. 1948	232.6	236.8	212.7	213.4	213.6
	% increase over 1939				
Aug. 1948	**111.1**	**123.2**	**79.2**	**78.1**	**79.5**

SAN FRANCISCO

Period	Residential Brick	Residential Frame	Apts., Hotels, Office Bldgs. Brick and Concr.	Commercial and Factory Buildings Brick and Concr.	Commercial and Factory Buildings Brick and Steel
1920	108.8	107.5	115.2	115.1	122.1
1925	91.0	86.5	99.5	102.1	98.0
1930	90.8	86.8	100.4	104.9	100.4
1935	89.5	84.5	96.4	103.7	99.7
1939	105.6	99.3	117.4	121.9	116.5
1940	106.4	101.2	116.3	120.1	115.5
1941	116.3	112.9	120.5	123.4	124.3
1942	123.6	120.1	127.5	129.3	130.8
1943	131.3	127.7	133.2	136.6	136.3
1944	139.4	137.1	139.4	142.0	142.4
1945	146.2	144.3	144.5	146.8	147.9
1946	159.7	157.5	157.9	159.3	160.0
1947	193.1	191.6	183.7	186.8	186.9
June 1948	215.6	213.6	202.9	209.7	204.8
July 1948	222.2	220.4	211.5	217.4	213.6
Aug. 1948	223.4	221.6	213.8	219.2	218.1
	% increase over 1939				
Aug. 1948	**111.6**	**123.2**	**82.1**	**79.8**	**87.2**

The index numbers shown are for combined material and labor costs. The indexes for each separate type of construction relate to the United States average for 1926–29 for that particular type — considered 100.

Cost comparisons, as percentage differences for any particular type of construction, are possible between localities, or periods of time within the same city, by dividing the difference between the two index numbers by one of them; i.e.:

index for city A = 110
index for city B = 95

(both indexes must be for the same type of construction).

Then: costs in A are approximately 16 per cent higher than in B.

$$\frac{110-95}{95} = 0.158$$

Conversely: costs in B are approximately 14 per cent lower than in A.

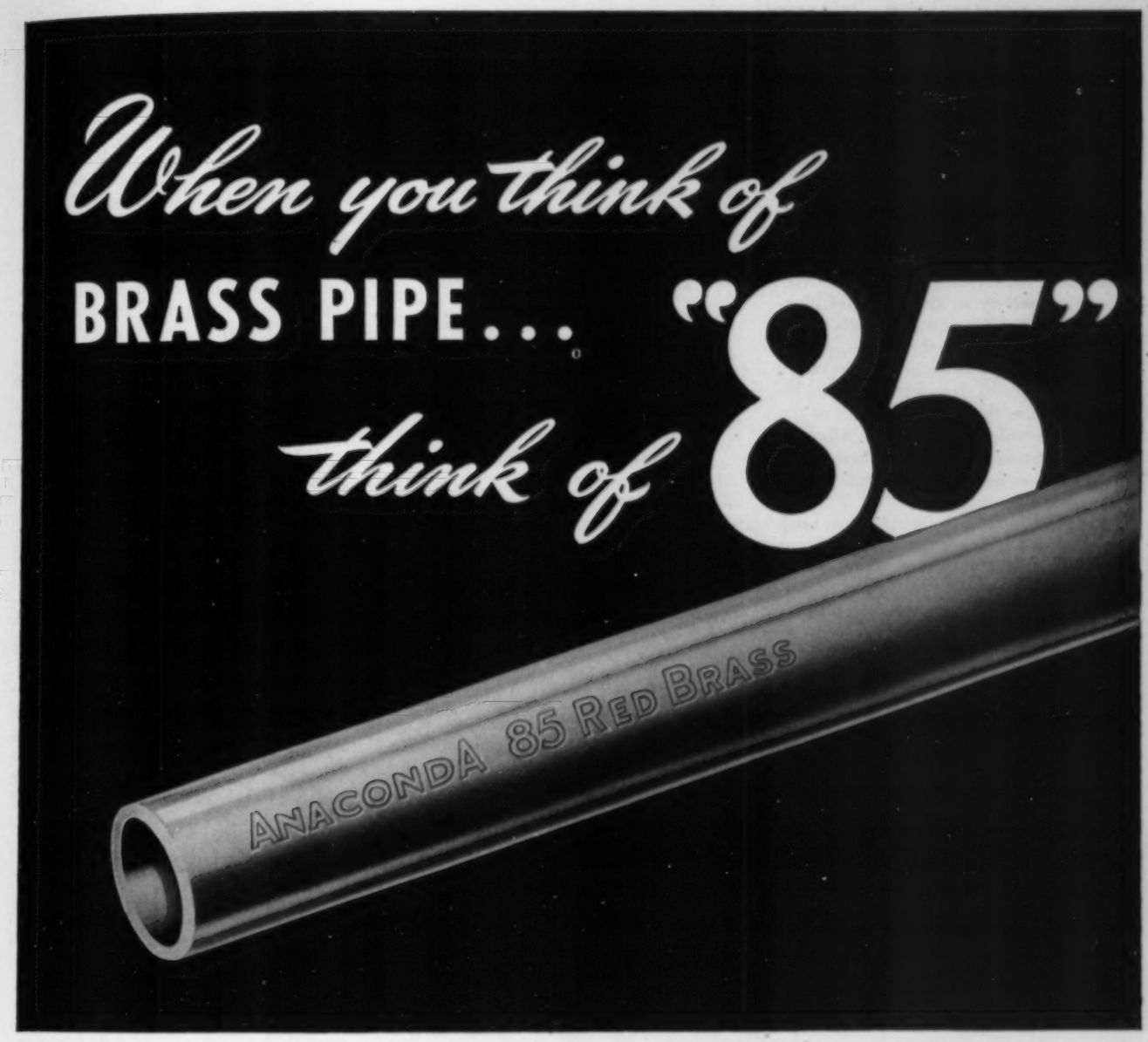
$$\frac{110-95}{110} = 0.136$$

Cost comparisons cannot be made between different types of construction because the index numbers for each type relate to a different U. S. average for 1926–29.

Material prices and wage rates used in the current indexes make no allowance for payments in excess of published list prices, thus indexes reflect minimum costs and not necessarily actual costs.

These index numbers will appear whenever changes are significant.

When you think of BRASS PIPE... *think of* "85"



OVER THE PAST 21 years, thousands of commercial and industrial installations have utilized millions of feet of Anaconda 85 Red Brass Pipe which, today, continues to give dependable, rust-free service.

This service record justifies the faith of The American Brass Company's engineers who recommended this pipe in 1927 (after ten years of exhaustive experiments) as the highest quality corrosion-resistant pipe obtainable at a reasonable price.

Today this same pipe, containing 85 per-cent of copper, sets new records for continuing high quality, uniformity of grain structure and proved dependability. It is furnished through wholesale distributors.

4735

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THE AMERICAN BRASS COMPANY

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Subsidiary of Anaconda Copper Mining Company

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New Toronto, Ont.

REQUIRED READING

BEHIND SAARINEN

Eliel Saarinen. By Albert Christ-Janer. The University of Chicago Press (5750 Ellis Ave., Chicago 37, Ill.), 1948. 9¾ by 12¾ in. xi + 153 pp., illus. $15.00.

The biographer's greatest temptation — to glamorize and hero-worship his subject — Albert Christ-Janer has overcome completely in this splendid biography of Eliel Saarinen. He tells Saarinen's story simply and directly, almost as an accompaniment to the many photographs and drawings of the architect's work with which the pages of the handsome volume are filled. Allowing the illustrations to speak for themselves, his own comments are presented with dignity and restraint.

Divided into two parts, the book covers first Saarinen's period of residence in Finland, and second, his migration to a new environment, the United States. In integrating the attitudes and forces affecting Saarinen's philosophy and art, the author has taken into consideration his Finnish birth, family background, inter-continental cultures, the nature of the esthetic in modern design, the historical trends of architectural design, and the philosophy of art education.

A comprehensive undertaking, this work includes a complete chronology, a chronological catalogue of Saarinen's buildings, and a general bibliography.

Saarinen, whose theme has ever been of a rational, yet artistic tenor, has achieved and expressed in his thinking and work the transition from nature to man-made form. And Albert Christ-Janer, so thoroughly understanding this, has crystallized Saarinen's concepts to produce a brilliant summation of one of the significant creators of today.

TO SIMPLIFY STORE DESIGN

Shops & Stores. By Morris Ketchum, Jr. Reinhold Publishing Corp. (330 W. 42nd St., New York 18, N. Y.), 1948. 9 by 11½ in. 308 pp., illus. $10.00.

This latest addition to the Progressive Architecture Library is a workmanlike and handy treatise on modern store design by an architect who probably has done as much store work as any man in the country. Morris Ketchum, Jr., is well aware of the multitudinous problems involved in such design, and is full of ideas as to how best they can be solved.

Starting with a brief introductory chapter on the development of store design in the United States, Mr. Ketchum works his way methodically through the basic planning of the store ("the indoor shopping street," "vertical sales traffic," "organizing the sales space"), illustrating his points with diagrams, photos and descriptions of actual and projected stores. He then turns his attention to equipment needs, including sales fixtures and lighting, merchandise transportation, loading and unloading facilities, etc., and mechanical equipment such as heating and air conditioning, ventilation, water supply, fire protection, communication. Succeeding chapters discuss materials and structure and the all-important store front.

All of this is basic source material for the architect and on the whole steers clear of the controversial aspects of store design. Equally useful and straightforward are the remaining two chapters dealing with typical shops and stores and the "shopping environment." The former discusses separately the specialty shop (flowers, jewelry, shoes, men's and women's clothing, and so on), the variety store (foods, drugs, hardware, furniture and others), and the department store. The final chapter is given over to city traffic problems, drive-in shops and stores, and shopping centers.

The book is well illustrated throughout, with diagrams and plans as well as photographs and drawings. The text is well written and carefully organized. Many of the plans and some of the diagrams, however, are too small to be legible, and most of them are all but spoiled by poor reproduction. It is too bad that a book which is sure to be widely used should have been permitted such mechanical defects.

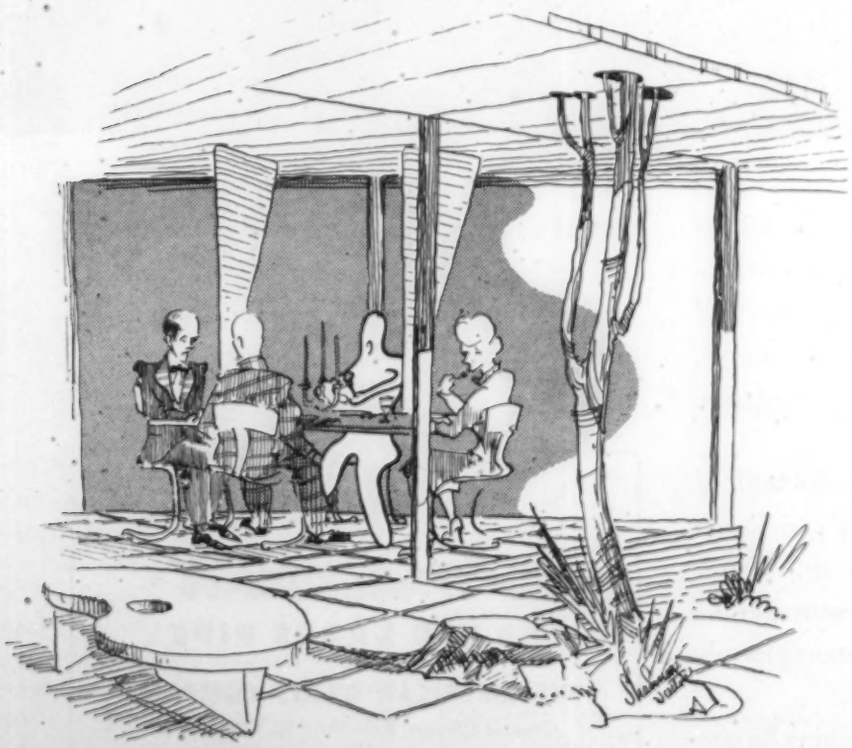
BRITAIN'S HOUSES

Houses for Moderate Means. By Randal Phillips. 1st American Edition. Transatlantic Arts, Inc. (Forest Hills, N. Y.), 1947. 7½ by 10 in. 128 pp. illus. $3.00.

Moderate means, says Randal Phillips, is an elastic term. Elastic, yes, but nevertheless, by way of being specific, Mr. Phillips has amassed in this volume from the work of contemporary British architects examples of houses which range in cost from £500–£2000. Most of the houses included were built before the war, the majority of them costing over £1000.

Mr. Phillips has devoted special attention to matters of plan, the question of style, materials, equipment, and building costs. Plan form, contingent on the problem of lowered costs, has been given careful consideration.

No single style is emphasized in this collection: the author has included the thatched-roof rustic cottage type, the easy formality of Georgian structure, and the dynamic horizontals and curves of modern architecture. Similarly, all kinds of materials and all types of construction are illustrated. Each house is presented in both photograph and plan, with a generous text description and full construction details. The result is an excellent volume for study.



He's been with us since the architect's first sketches.

— Drawn by Shannon Sutton

ARCHITECTURAL

RECORD

THE BASIS FOR THE HIGHEST HONOR

The delegates and members of the American Institute of Architects, in convention assembled June 25, 1948, expressed overwhelmingly, by a sense-of-the-meeting vote, their desire to have the Institute's highest honor bestowed on Frank Lloyd Wright. This honor, The Gold Medal, "is awarded in recognition of most distinguished service to the profession of architecture or to the Institute." However, the honor is not bestowed by vote of delegates or by letter-ballot of members. It has been bestowed only by the unanimous decision of the Board of Directors of the Institute.

Following the early-established procedure of representative government, the members of the Institute select by vote men of experience, ability and integrity to serve as Directors, to exercise sound judgment in conducting the affairs of the organization. They have been elected without mandates as to specific policy, platform or program. Theirs is thus a free discretionary power in regard to many most important matters. They must therefore have sound, objective, unprejudiced basis for judgment in exercising this power.

The only basis for awarding the highest honor of the Institute is that of recognition of most distinguished service to the profession (or to the Institute). On this basis, Frank Lloyd Wright is the pre-eminent candidate for the honor. The service of his influence on architectural design, by both precept and example, is unequaled by any living architect. More than any other individual, he has revitalized and stimulated the thinking of the profession. In addition, he has done more than any other to arouse public interest in architecture as a vital factor in the life of the times. One does not have to approve all his theories or his designs to recognize and acknowledge at least these two factual evidences of his most distinguished service to the profession of architecture.

No factors other than that of distinguished service should be considered in bestowing the Gold Medal. All other considerations are irrelevant and immaterial to reaching an objective decision. And only an objective decision, unbiased by such irrelevant considerations or by personal feelings or prejudices, should be reached in awarding the highest honor the Institute can bestow. On the only sound basis for judgment, Frank Lloyd Wright is the logical recipient of that highest honor in 1949.

Kenneth K. Stowell

EDITOR

Herbert Matter's screen (white T-frame, black and white string—see cover also) defines the foyer without blocking space; creates a tantalizing view and three-dimensional illusions; suggests textile weaves. Sign, black on red; middle partition, lemon yellow

SPACIOUS BUT INTIMATE; SIMPLE BUT SUBTLE

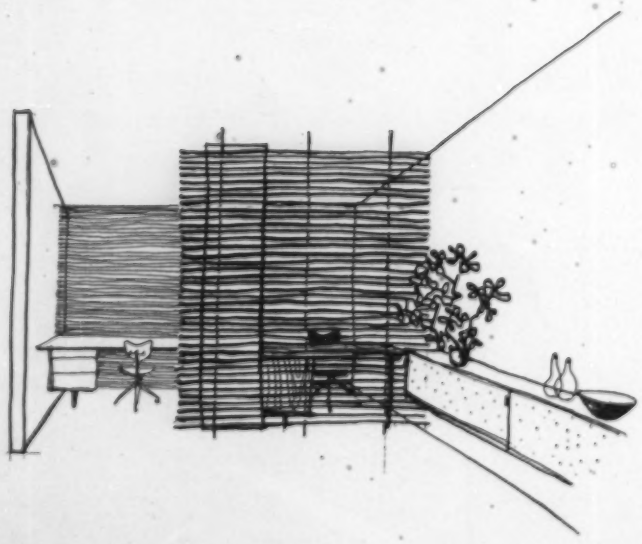
Showroom for Knoll Associates, Inc., New York

By the Knoll Planning Unit, Supervised by Florence Knoll

WHEN the Knolls started redoing their showroom, to bring in the textile division of a rocketing modern furniture-furnishings business, something special was to be expected. Despite the added exhibits, the room now looks larger than it did (high-keyed in white and flat bright primary colors; no separating walls but screen partitions in skeleton frame laced with Herbert Matter's string). Despite the big space the effect is intimate, homelike (small groupings, well organized, bounded by air not by alcoves and stuff). The distinguished avoidance of cheap tricks, the knowing management of straightforwardness, yielded the vibrant result at very small expense. Composition grows out of lines, linear textures, flat planes and colors, natural grains.

3

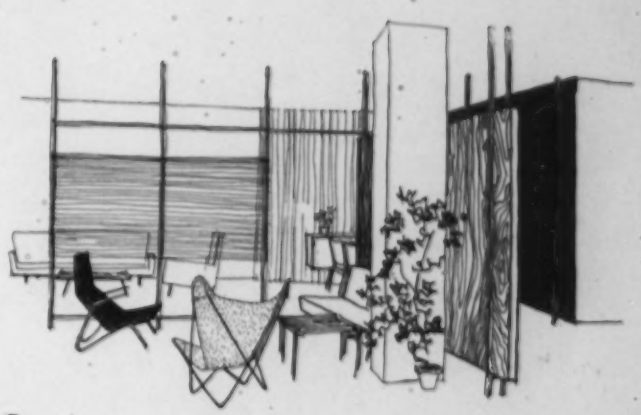
Damora



Illustrations are keyed to camera angles indicated on the plan. Here is the area next to the office (at left in the plan) and a glimpse into the office. The bamboo screen, seen in both views, renders the minimal office space unobtrusive from the showroom; and yet, by a well known optical effect, it gives occupants the feeling of being in the big room with plenty of space

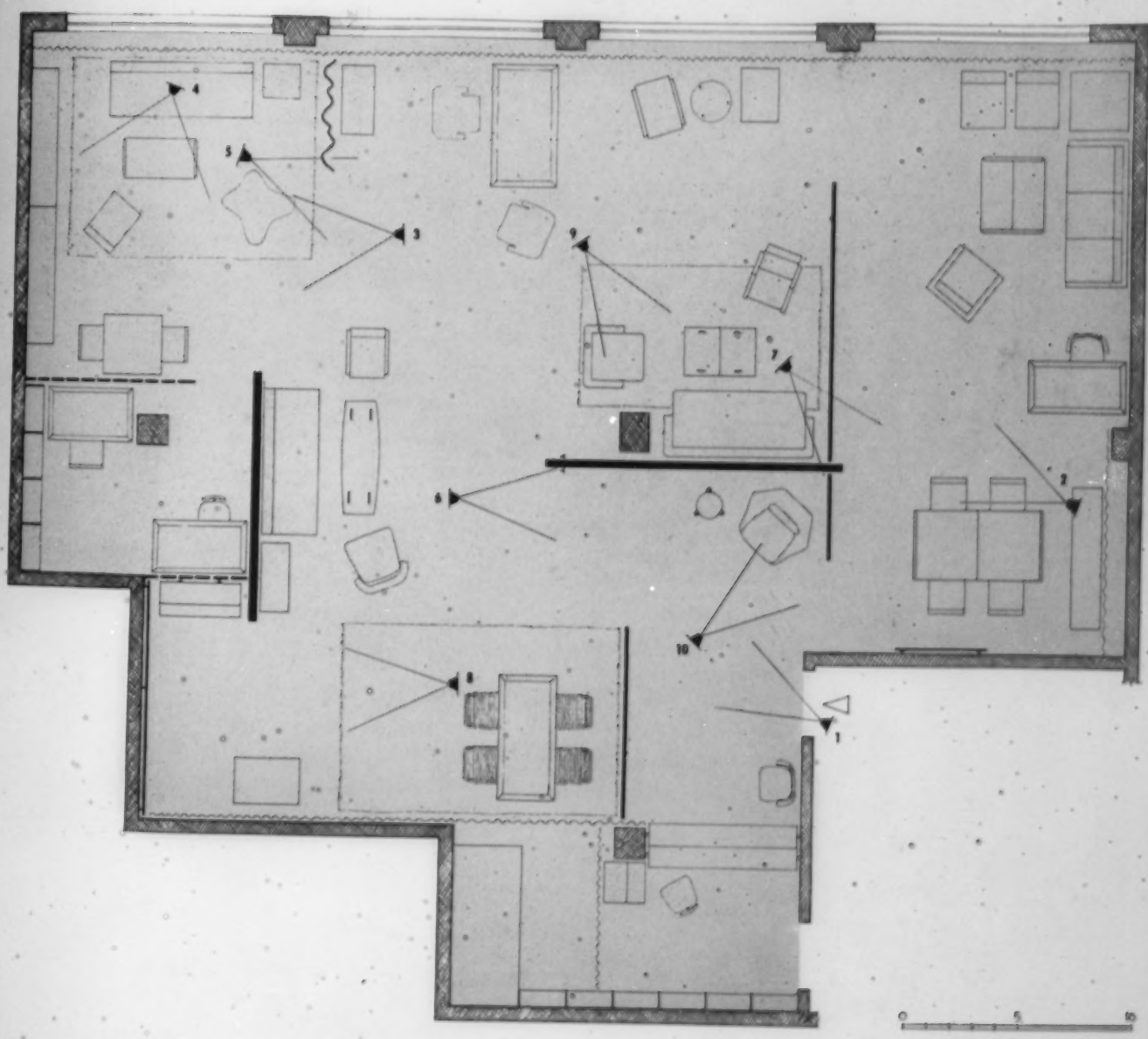
4

Plan shows how subdivision is obtained by screens (which are detailed further on). Walls and ceilings are white, except as noted. Heavy vertical line at left in plan indicates a dividing screen, painted lemon yellow (view 1, page 92). Against the wall next to it, lower left-hand corner, is the bright checkerboard display of upholstery fabrics (see cover). The wavy line, starting along the wall at the bottom, stands for drapes, hung floor to ceiling, another kind of color splash (cover). The horizontal black line, middle of the room, is a wood panel in natural cherry (views 2, 6), the lighter vertical black lines are the skeleton frames strung with string or translucent fabrics. The right-hand wall of the room, from drapes to drapes, is a transparent sky blue; but in the same room the short "back wall," opposite the windows, is jet black, carrying a calligraphic photomural. (7)



5

Sketches by Florence Knoll



6

Eero Saarinen's chair (left-hand page) is a good example of Knoll's modern furniture. In appearance more like a bent leaf, arrested in mid-air, than like the usual elephantine overstuffed club chair, it allows easy sitting in many informal postures, is light enough to pick up and carry around. Its metal frame holds a plastic shell padded with foam rubber, covered with gray wool fabric.

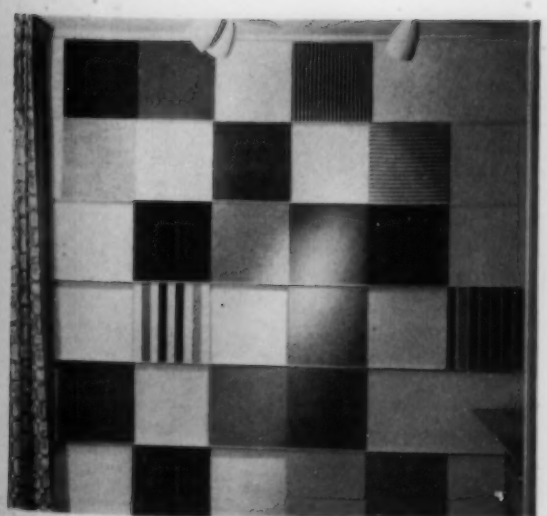
Knoll designers range the western world, include people such as Saarinen, Richard Stein, Noguchi, Nakashima, Sorensen, Markelius, and scores of others, not forgetting the Knolls themselves.

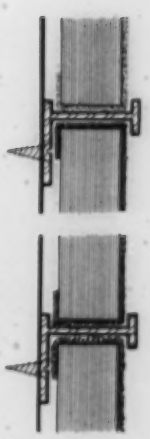
Behind the chair is the cherry panel which is detailed overleaf, and the skeleton screen which divides without separating two room areas. Photomural is by Max Bill

7

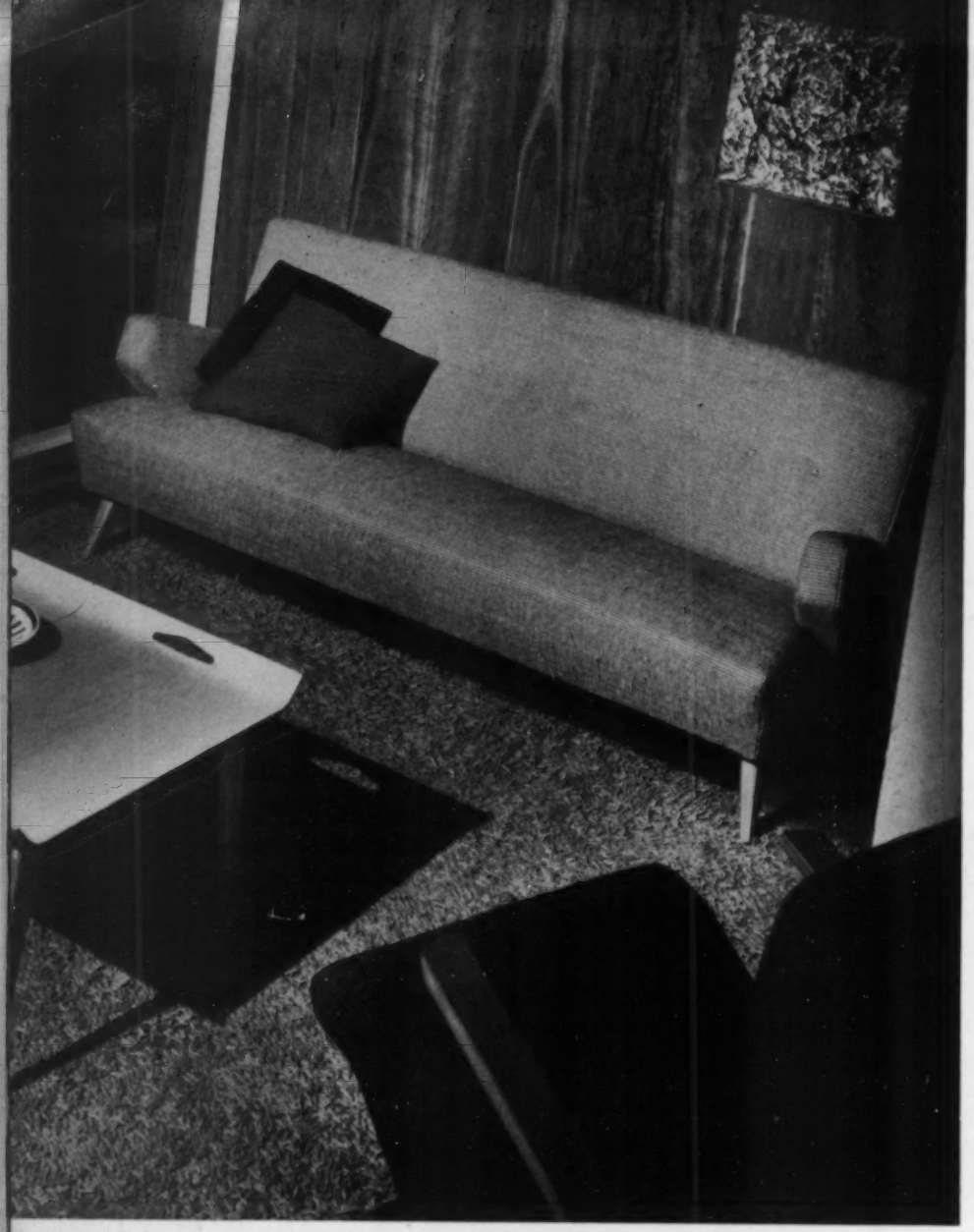
Damora

8





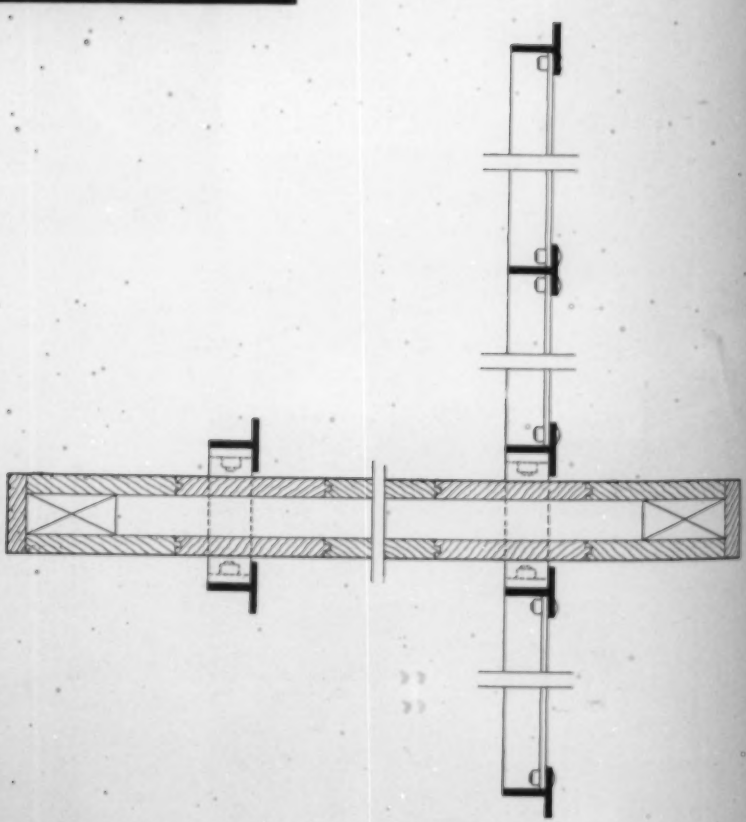
This ingenious checkerboard of upholstery samples, on sliding square panels, replaces the usual hinged frames, conserves room space, facilitates comparison. Drape materials hang naturally on a rod along the adjacent wall



Sofa group shown on this page is on the opposite side of the cherry screen from Saarinen's chair shown two pages further back. Across-page is seen that part of the room which is at the extreme right of the general plan (page 95). Light gray cotton shag rugs help keep the floors light and "blond" in tone, keep the space bright and high in key, add a natural and simple texture, linear in its character

9

Cross-section shows the extreme simplicity of the construction in the skeleton screen and cherry panel which form the cross in the middle of the large room, dividing the open space into areas, each of which has its own identity though all subtly cohere as parts of the big space



"WITH A FINE ITALIAN HAND"

House of Italian Handicraft, New York

Gustavo F. Pulitzer, Architect

OBJECTS displayed in this converted 3-story "brownstone" house are not mass-produced. They are originals done with a fine Italian hand. Most are chosen for special suitability to quantity copying in America, under license, in the manner of a Paris dress.

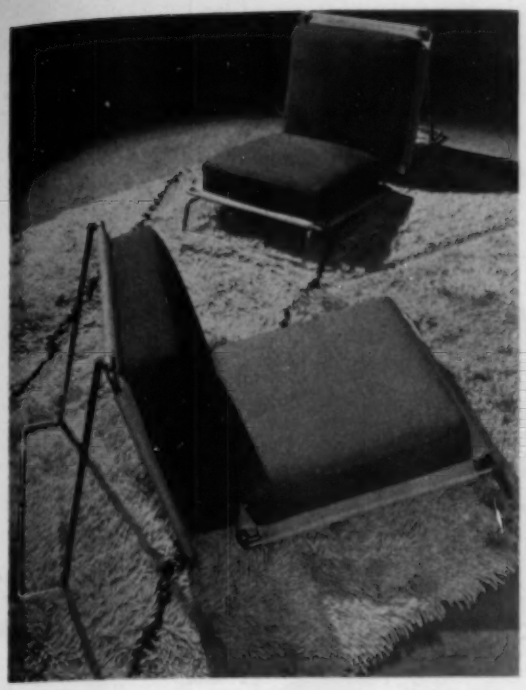
In keeping with this handicraft aim, so different from the pure quantity-production concept of an American firm such as Knoll (see preceding pages), the architect has relied for background on a hand-tailored curved wall, on mosaic murals, on special materials and devices, rather than a play with simple mass materials such as string and metal bars. Both kinds are contemporary.

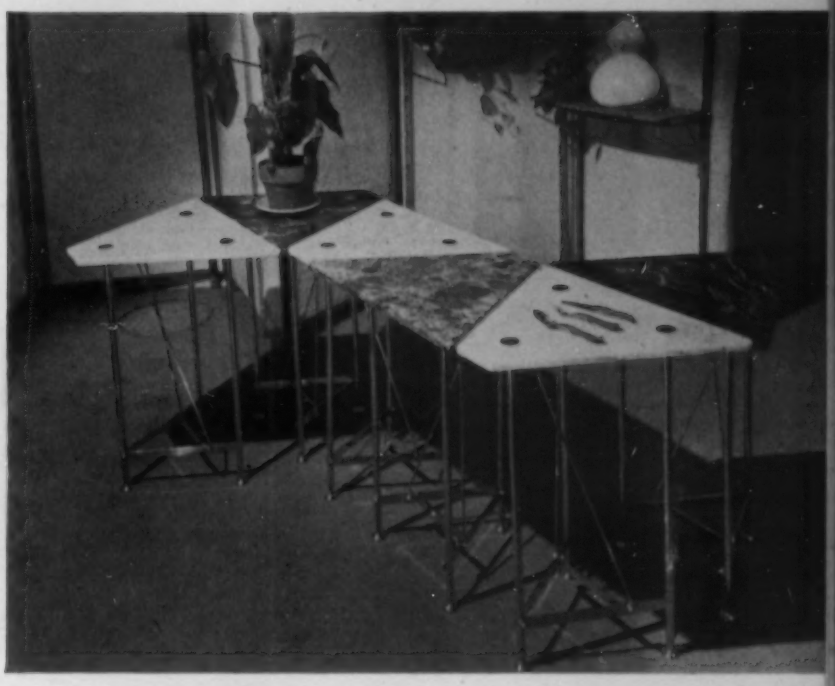
The House of Italian Handicraft is an effort to help Italians manage recovery by doing what they do best, not the mass-produced object but the model, highly refined. Display is to the trade. The reception room, seen on these two pages, is important.

The entrance foyer, as seen from the room (right), is largely transparent, does not visually subtract much of the precious space from the room. As seen from within (bottom of page), its plate glass panel is contrived not only as a show window but also as an inviting peep upstairs; while the glass door directs the entrant straight, and pleasantly, to the receptionist

Ben Schnall Photos

A fine-feathered modern rococo characterizes this "patio" designed by Fabrizio Clerici and assembled in Italy. The object in the center of the room is a multiple bird-cage, like something out of a surrealist painting, the cubicles bounded by a variety of metal screens, extruded lath, mirrors (for birds needing company), clear and tinted glass. The prints on the walls, by Piero Fornasetti, are black on lacquered wood; and the pink or yellowish shell frames give a delicate recherché tone. Wall panels of woven natural straw add another subtly soft note. The shuttered panel barely visible behind garden chairs at extreme left of top photograph is an attempt at a lighting fixture as big as a window and suggesting one

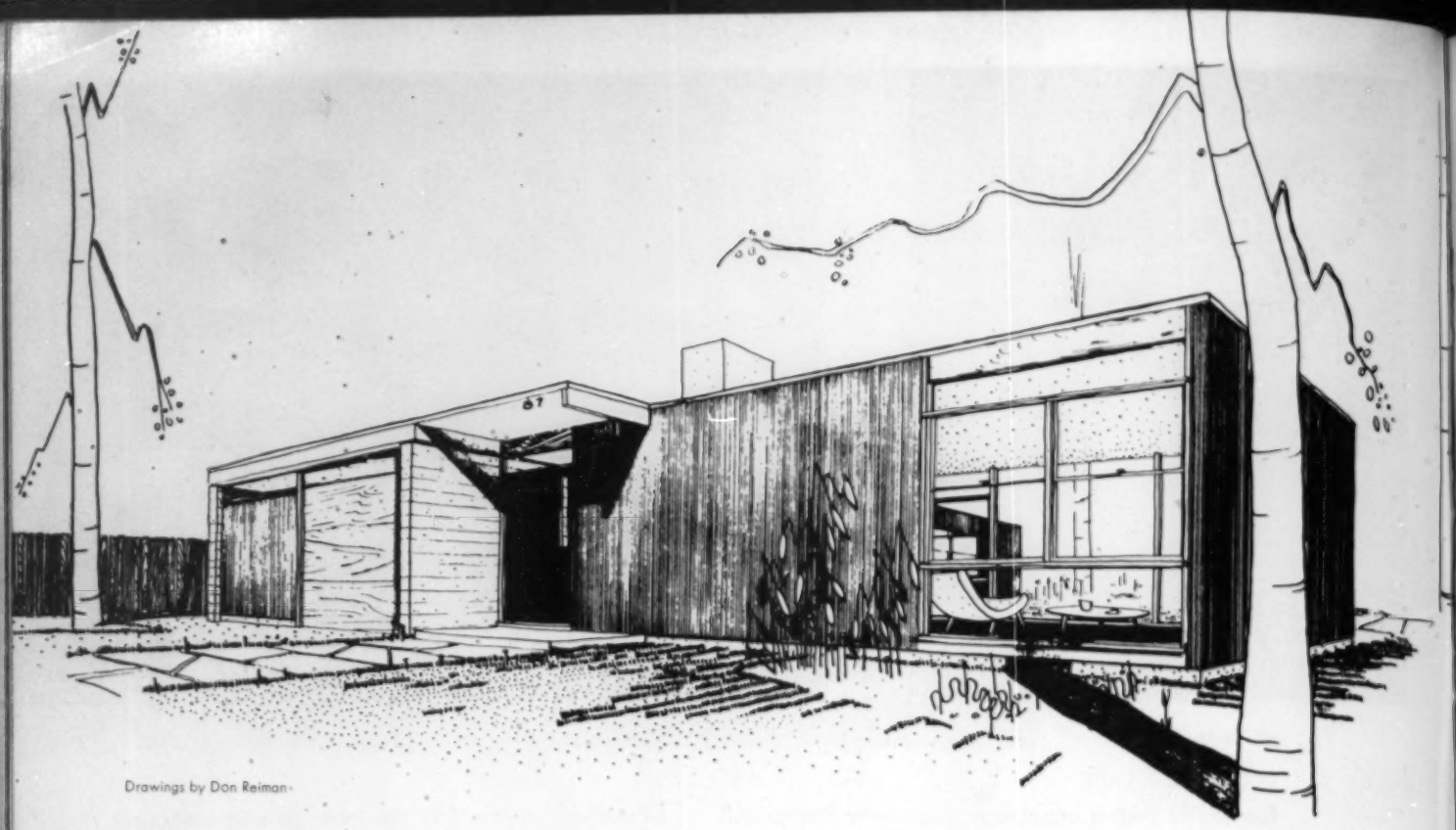




Hans Van Nes Photo

Functionally modern arrangement upstairs by Rogers and Gardella shows surprising agility. Especially successful is the solution for a low-scale cushion chair (same designers) usable singly (bottom photograph) or back-to-bottom in pairs (see left above). (A leather strap, missing from pictures, prevents collapse of back.) Another ingenuity is the portable stand-lamp (see below). Polished stones, permanently scattered in the room close to walls, are drilled so the light-weight tubular standard can simply be dropped in, and the lights plugged in, wherever light is wanted in the room. Note that the triangular rugs, modular, vari-colored, echo the interchangeable tables (see top, right) with their brass legs and characteristically Italian tops of marble in many patterns

Foto Fortunati



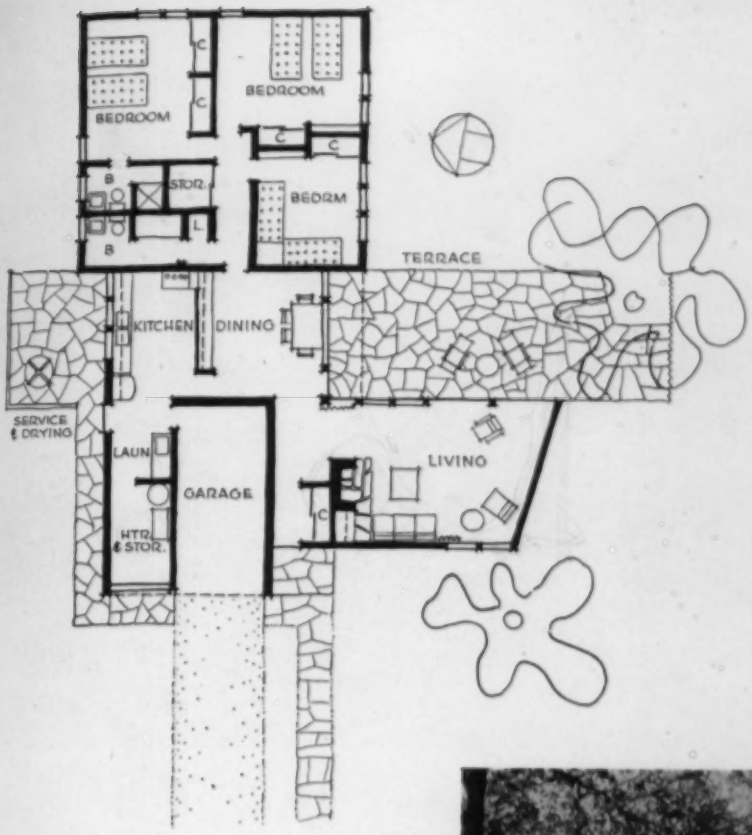
Drawings by Don Reiman

CONTRIVED FOR CONVENIENCE AND COMFORT

House of Mr. & Mrs. Robert Wile, White Plains, N. Y. ***Sanders and Malsin, Architects***

IN THESE days of hard-or-impossible-to-get servants, the Wiles wanted their house to be easy both to live in and to keep up, an open uncluttered place, economical of time and effort as well as dollars. Because of its open flexibly-planned living areas and its spacious glass walls (to the east in the living room and to the south in the dining room), the house seems larger than its dimensions would indicate. Living and dining areas expand toward the morning-sun-catching terrace while the solid south wall of the living area is angled to broaden the garden vista while still insuring privacy. Much of the charm and "warmth" of the interior is due to the color, grain and texture of the plywood walls. All walls, both interior and exterior, are of plywood, glued, butt-jointed. Step-saving convenience is contrived in the compact centralizing of the kitchen and services — laundry, garage, heater and storage. Straight line plumbing serves baths, kitchen, laundry, and heater. Copper tubing in the plaster ceiling provides radiant heating controlled by thermostat. The roof drains toward the center, eliminating gutters and external downspouts. Credit for excellence of construction goes to the Sterner Building Service

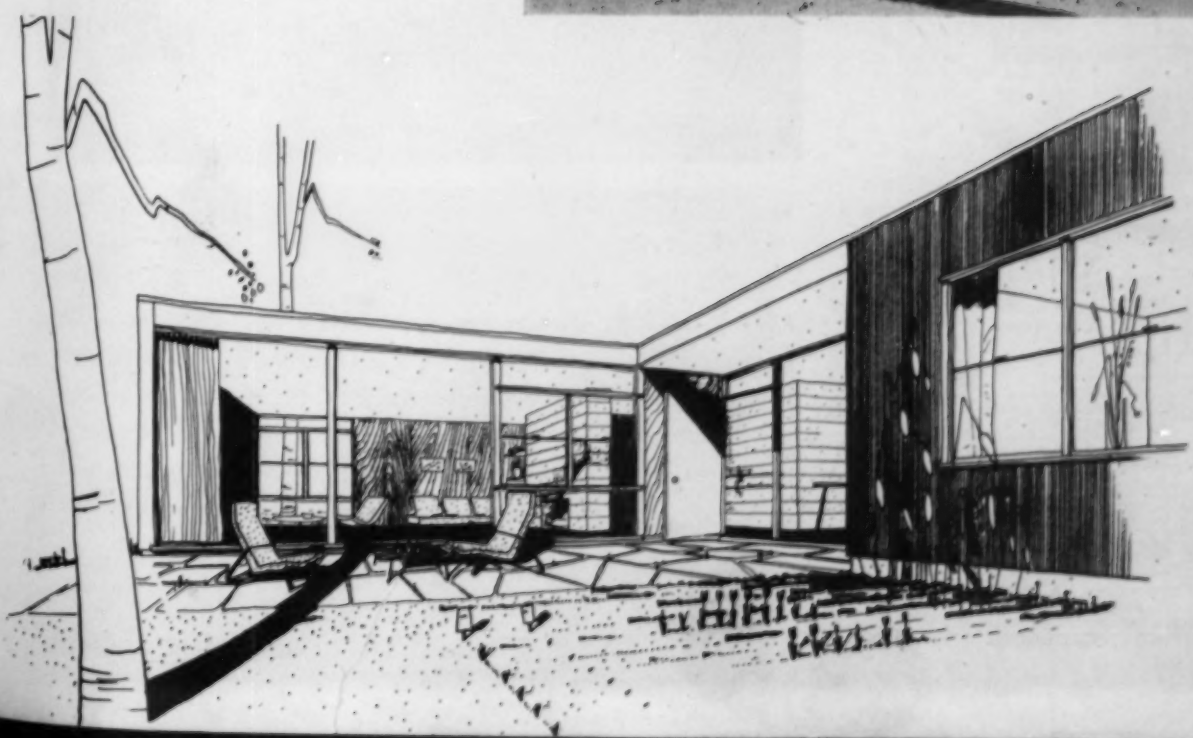
Trees provide shade from the summer sun so no broad eves or wide roof overhangs were necessary. Winter sun is welcome. Grain of the exterior plywood has been rubbed with white paint and produces a pleasant rose tint. Stock aluminum windows were used throughout

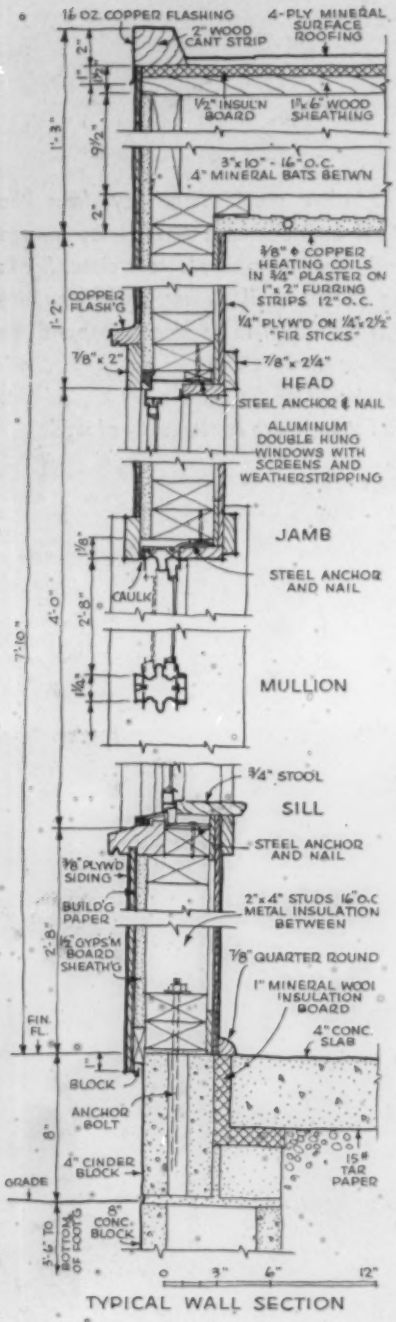


The plan provides privacy from the street and openness toward the terrace and garden. An ample coat closet flanks the entrance hall. Ceiling-tracked curtains can be drawn to enclose or expand the various areas. Bedrooms are well sound-isolated from the living room and closets and storage are conveniently placed.

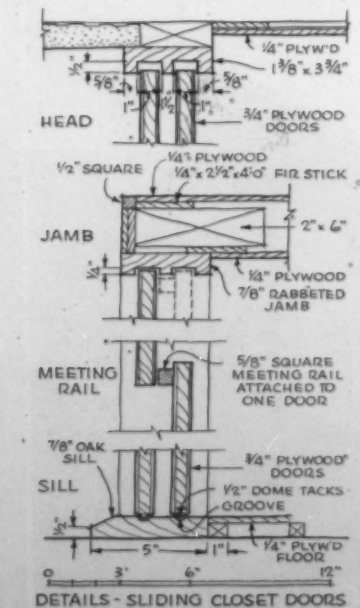
Stowell Photos

The glass of the living room's east wall reflects the sunlight and shadow of the bedroom wing. In summer the terrace is shielded by the living room from the late afternoon sun. The door opens out from the dining room to the terrace

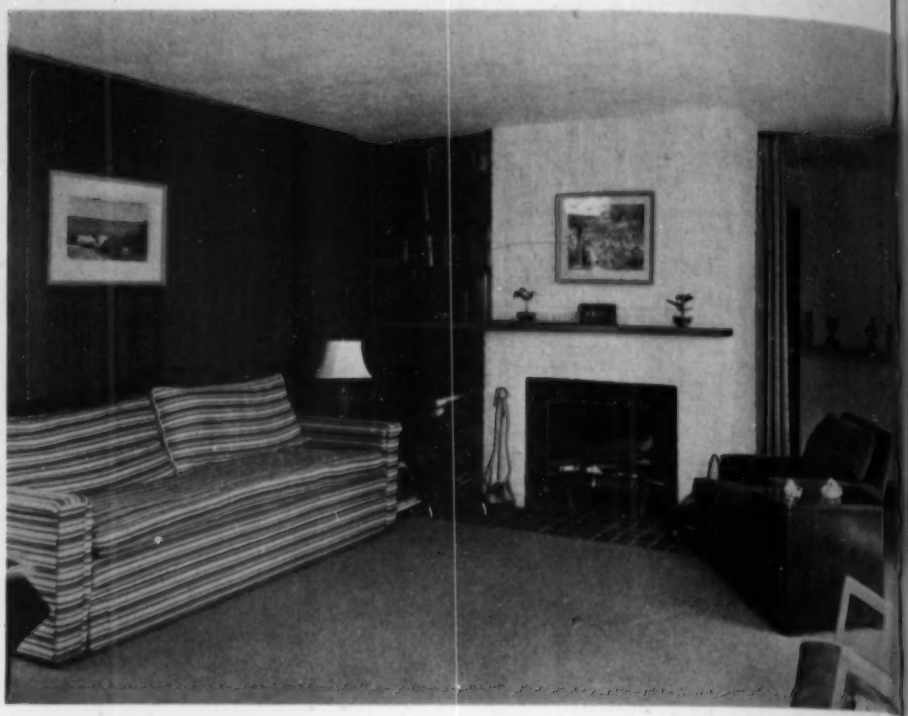




TYPICAL WALL SECTION



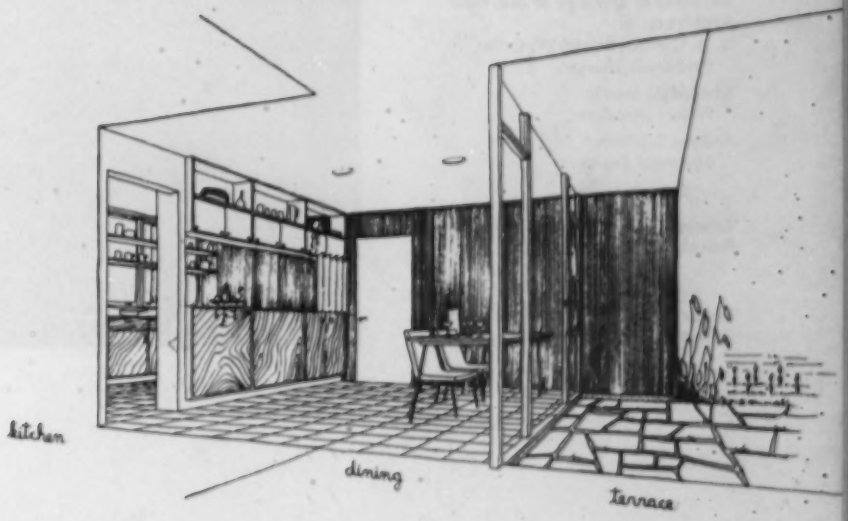
DETAILS - SLIDING CLOSET DOORS

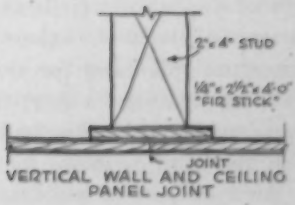


Stowell Photos

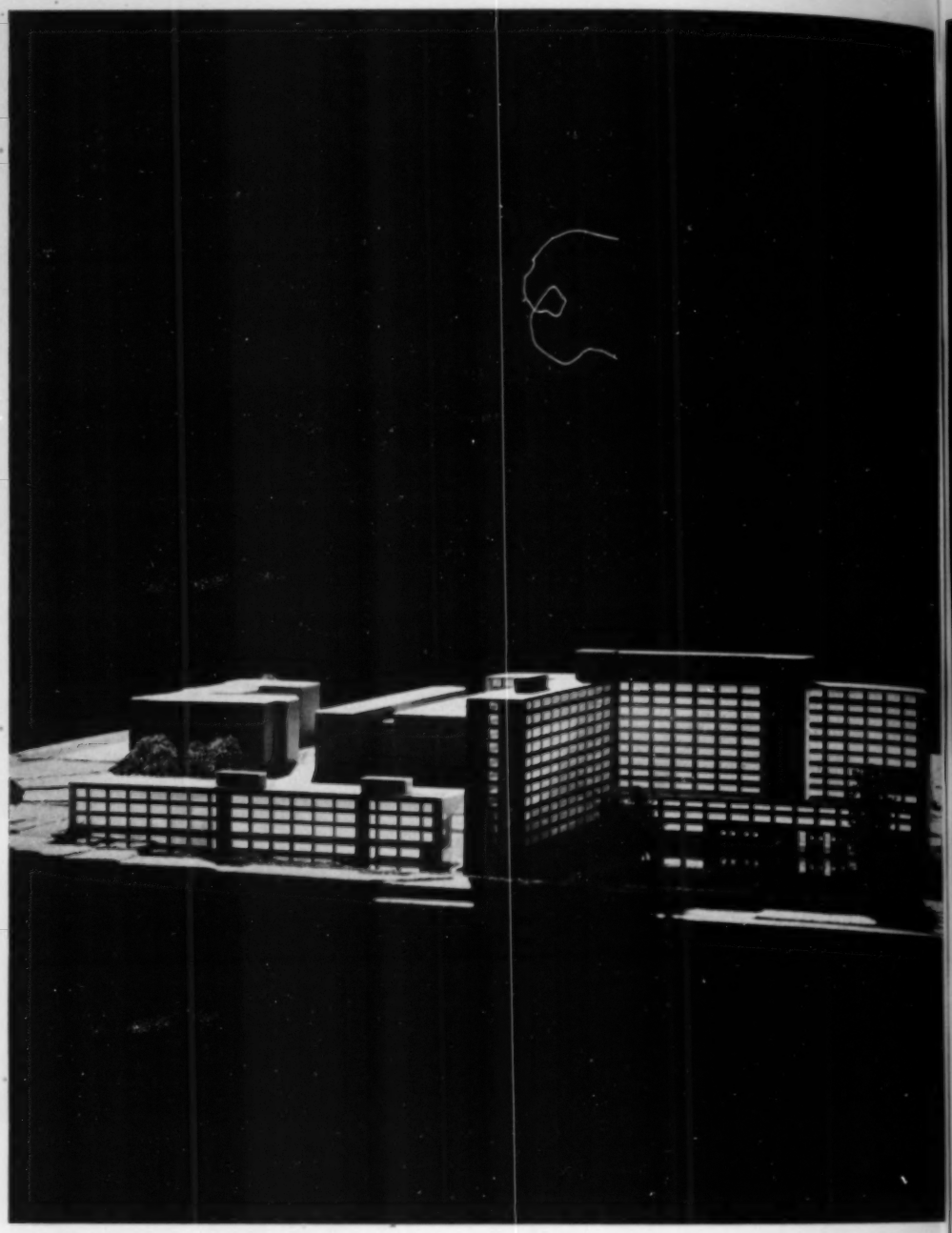
Right: details were carefully studied for simple efficiency and economy of materials and labor. Walls and ceiling are insulated. Top: wood for the fireplace is handy under the bookshelves. The rich brown of the plywood walls contrasts pleasantly with the white of the fireplace and the colors of the upholstery. The curtain can be drawn to complete the fireplace wall. Above: the venetian blinds of the bedroom-study cast shadow patterns

The south wall of the living room is splayed to embrace the view of terrace and garden. Right: sketch showing the pass-cabinet-wall which saves steps between kitchen and dining room. Dining table can be placed (and usually is) next to counter for utmost convenience. Ceiling down-lights are arranged for either dining table location. Below: the well-equipped kitchen with its cabinets, shelving, and pass-cabinet (with wood-slat curtain)





VERTICAL WALL AND CEILING PANEL JOINT



Hedrich-Blessing Photos

The Ohio State University
Dr. Howard L. Bevis,
President
Dr. Charles A. Doan,
Dean of the College of Medicine
Dr. Wendell D. Postle,
Dean of the College of Dentistry

Ohio State Department of Public Works
George B. Sowers,
Director

Ohio State Department of Health
Dr. John D. Porterfield,
Director

Ohio State Department of Public Welfare
Charles L. Sherwood,
Director

Skidmore, Owings & Merrill—Architects
N. A. Owings, Robert W. Cutler,
Partners in charge
Edward A. Merrill,
Project Manager
Andrew J. Brown,
Structural Engineer

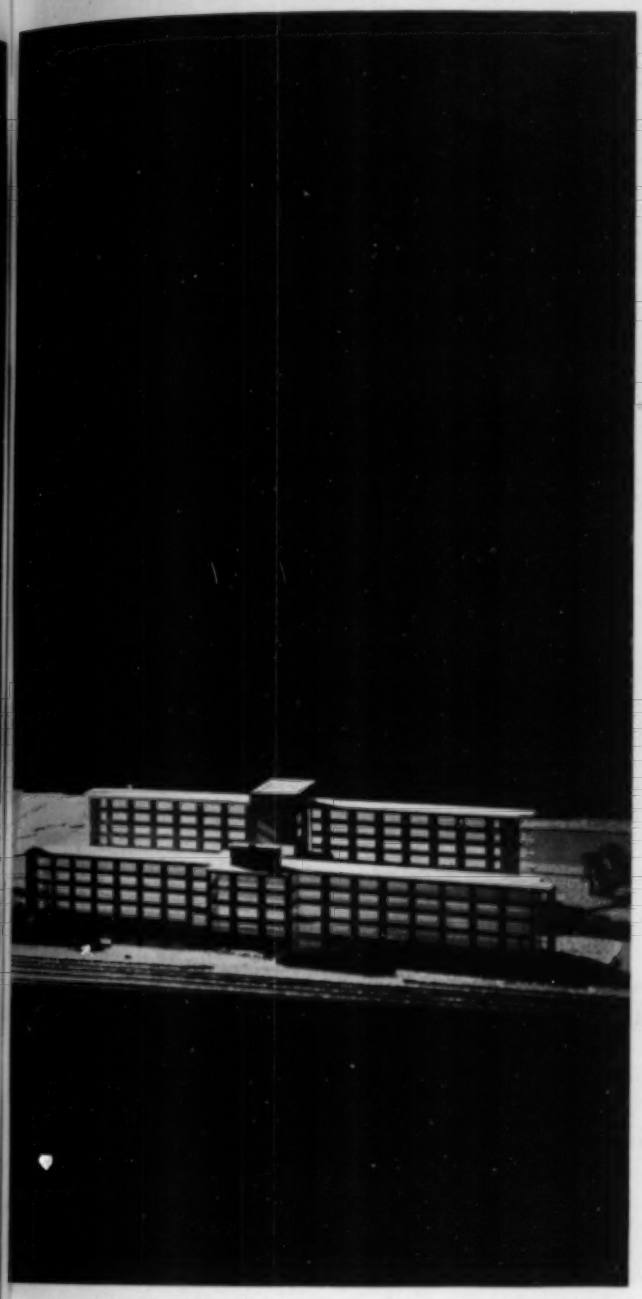
Edwin A. Salmon—Hospital Consultant

Samuel R. Lewis and Associates—Consulting Mechanical Engineers

THE idea behind the expansion of the Colleges of Medicine and Dentistry at Ohio State University is to develop a major medical center for the state of Ohio. It was felt that the state's comprehensive program of teaching, medical research, and treatment of patients in the various educational, health and welfare institutions required a center which would lead and correlate these three functions of medical service. Each of the cooperating agencies will be benefited by avoiding necessity of duplicating facilities and by having available the specialists on the others' staffs.

Architectural planning for this expansion has been on both a long-term and a short-term basis. On the long-term basis, areas on the campus have been reserved and provision for utilities made for all buildings contemplated. Arrangement of buildings to be erected in the first phase is such that later buildings can tie in logically with them. The short-term program, representing only those functional elements which were most urgently needed and which could be constructed under existing appropriations, was governed by the premise that at any stage of the development, the plant must be self-sufficient, without dependence on future buildings for efficient operation.

New buildings to be erected in the first or short-term phase are a 600-bed University Hospital, College of Dentistry building, 300-bed Tuberculosis Hospital, and 140-bed Receiving Hospital for mental patients. Later stages of the program will include an Out-Patient and Medical Research Laboratory building, Animal Research Institute, Medical Library, Auditorium, and at least two additional hospitals of 200–300 beds each.



Skidmore, Owings & Merrill

Architects

MEDICAL CENTER FOR

OHIO STATE UNIVERSITY

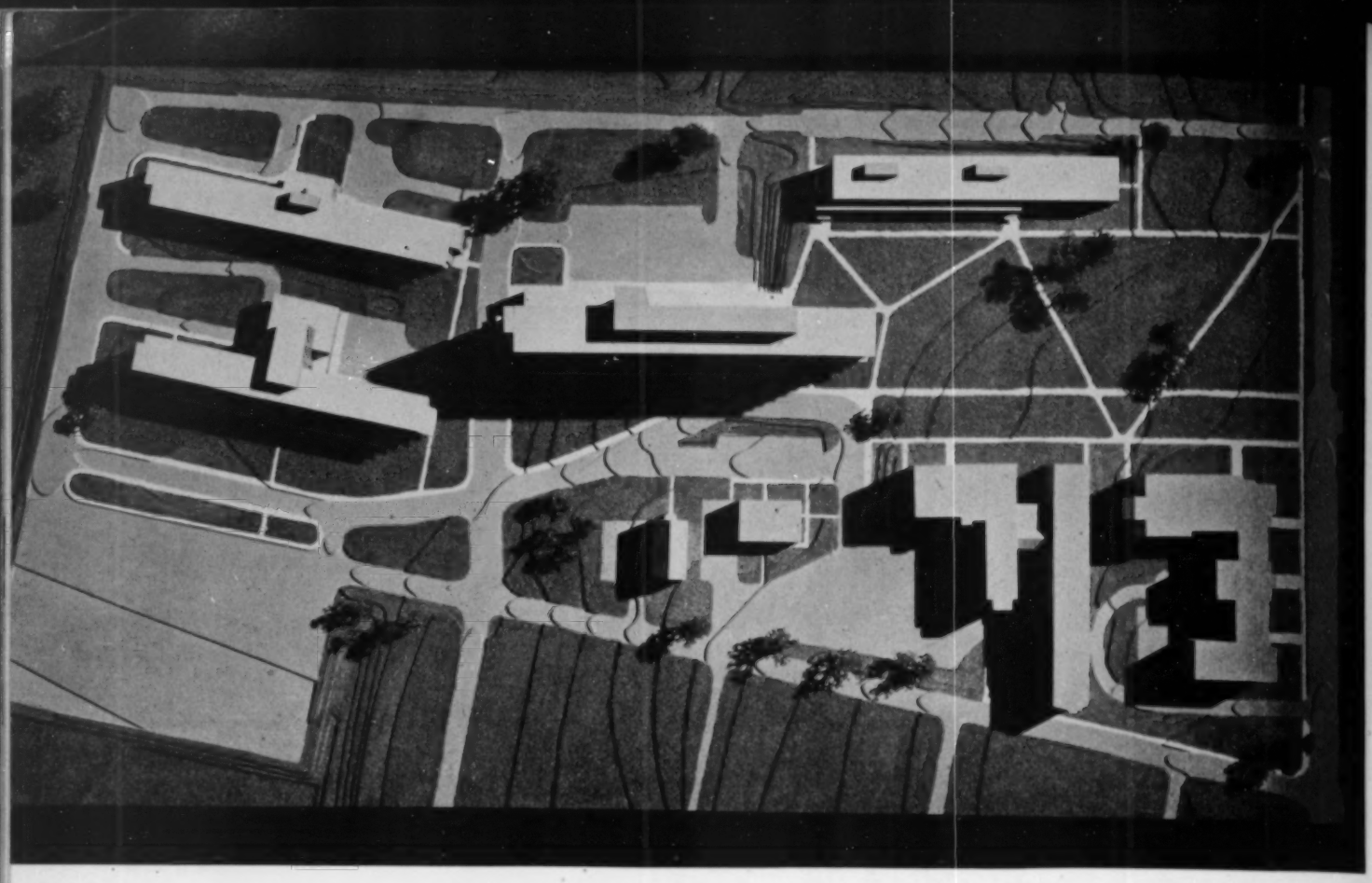
Existing University facilities have been incorporated into the program. These include Hamilton Hall, the present teaching unit of the Medical and Dental Colleges; Starling-Loving Hospital, the present 300-bed University Hospital; other teaching facilities available to medical students, under the University's non-professional departments; and the service facilities such as laundry and power plant. Upon completion of the new University Hospital, Starling-Loving Hospital will be converted to general Medical College uses.

Progress to date includes the start of construction of the 600-bed University Hospital and the College of Dentistry building; contracts awarded on the Receiving Hospital; bids to be received this fall on the Tuberculosis Hospital; and working drawings completed on the Out-Patient Clinic and Medical Research Laboratories.

Site

The logical site for the Medical Center was the Ohio State University campus — first, to use the University colleges as the nucleus for expansion into the Center; second, to locate the Center in Columbus close to the headquarters of cooperating state departments; and third, to make use of the available areas allocated for expansion of the University's facilities.

The Center's location at the southwest corner of the campus permits access to the hospitals from the city of Columbus on the south, separate from campus traffic. The site includes land adjacent to Neil Avenue at the general level of the campus buildings and extensive areas of lower land lying west toward the Olentangy River. Some filling will be necessary to utilize this part of the area. After full consideration of alternate loca-

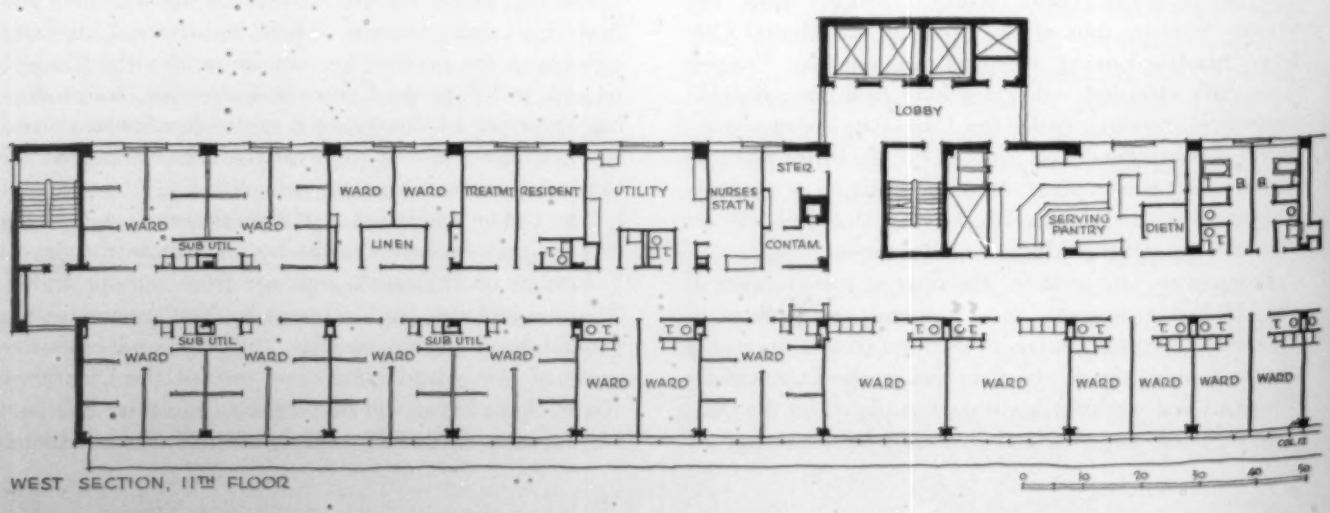


Model includes only the buildings in the immediate program, shown here in relation to existing medical buildings

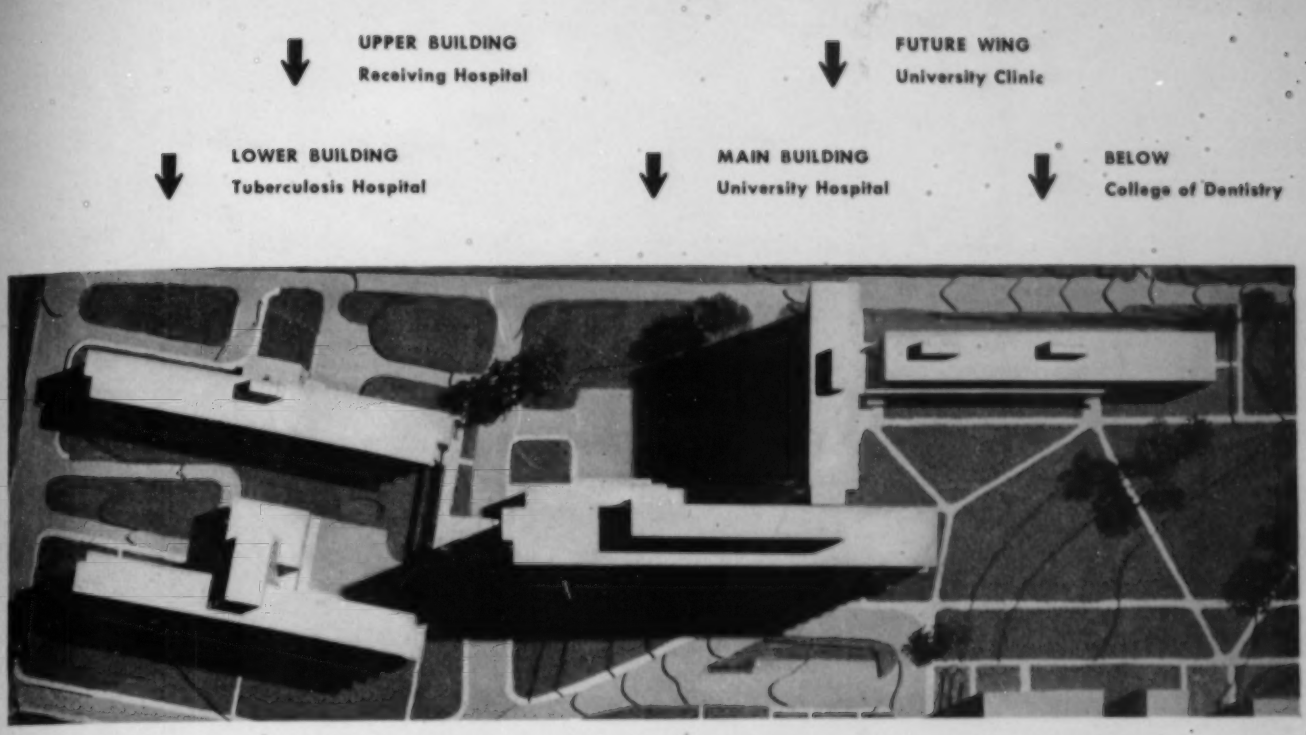
tions, the buildings were finally placed well toward the east to reduce the total amount of fill, to maintain closer coordination with existing buildings, to reduce the length of service connections, and to leave available for recreation purposes the meadows along the river and adjacent to the athletic plant.

Two major considerations in planning were orientation and separation of public and service circulation. The location of the buildings permitted a generally east-west alignment and the orientation of practically all of the patients' rooms in the three hospitals toward the south for maximum sunlight. Adjacent buildings are low and these rooms will get unobstructed sunlight and air. The use of a projecting canopy over windows cuts out the high and hot summer sun while permitting the low-lying winter sun to penetrate far into the room. On a typical nursing floor, then, each hospital will have a series of wards along the south side of the building while the service rooms with good work light will be to the north with the stairs and elevators.

The final site chosen involved a fortunate slope in ground level which facilitated planning of circulation in the University Hospital. It made feasible the locating of emergency and service entrances on the ground floor at the west end, separated from the visitors' and students' entrance on the first floor at the east end of



WEST SECTION, 11TH FLOOR



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Model including also buildings to be added at a later time, University Clinic, Research Laboratories and connecting buildings

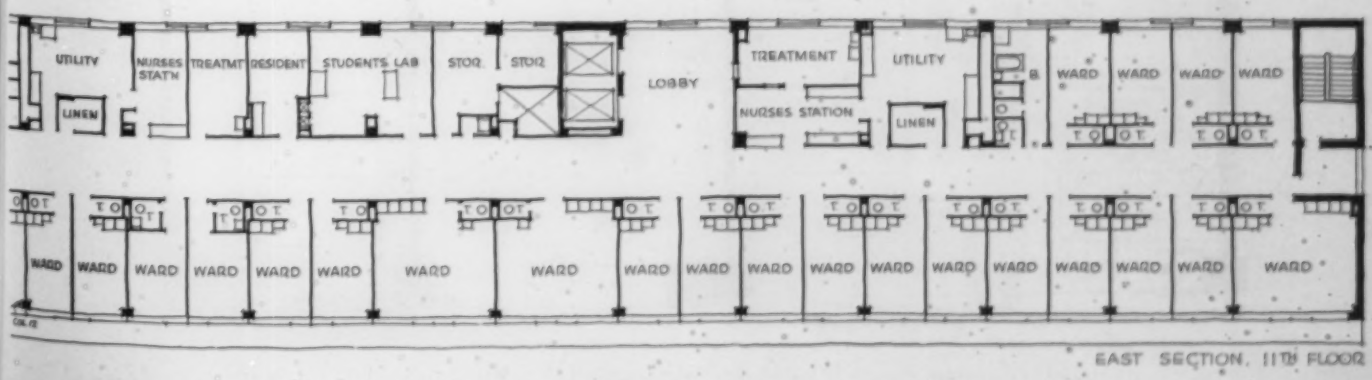
the building, thereby separating two traffic flows which have no relation to one another. Correspondingly, the elevators are divided into two groups to allow a separate and coincident handling of service and visitors, greater control and convenience.

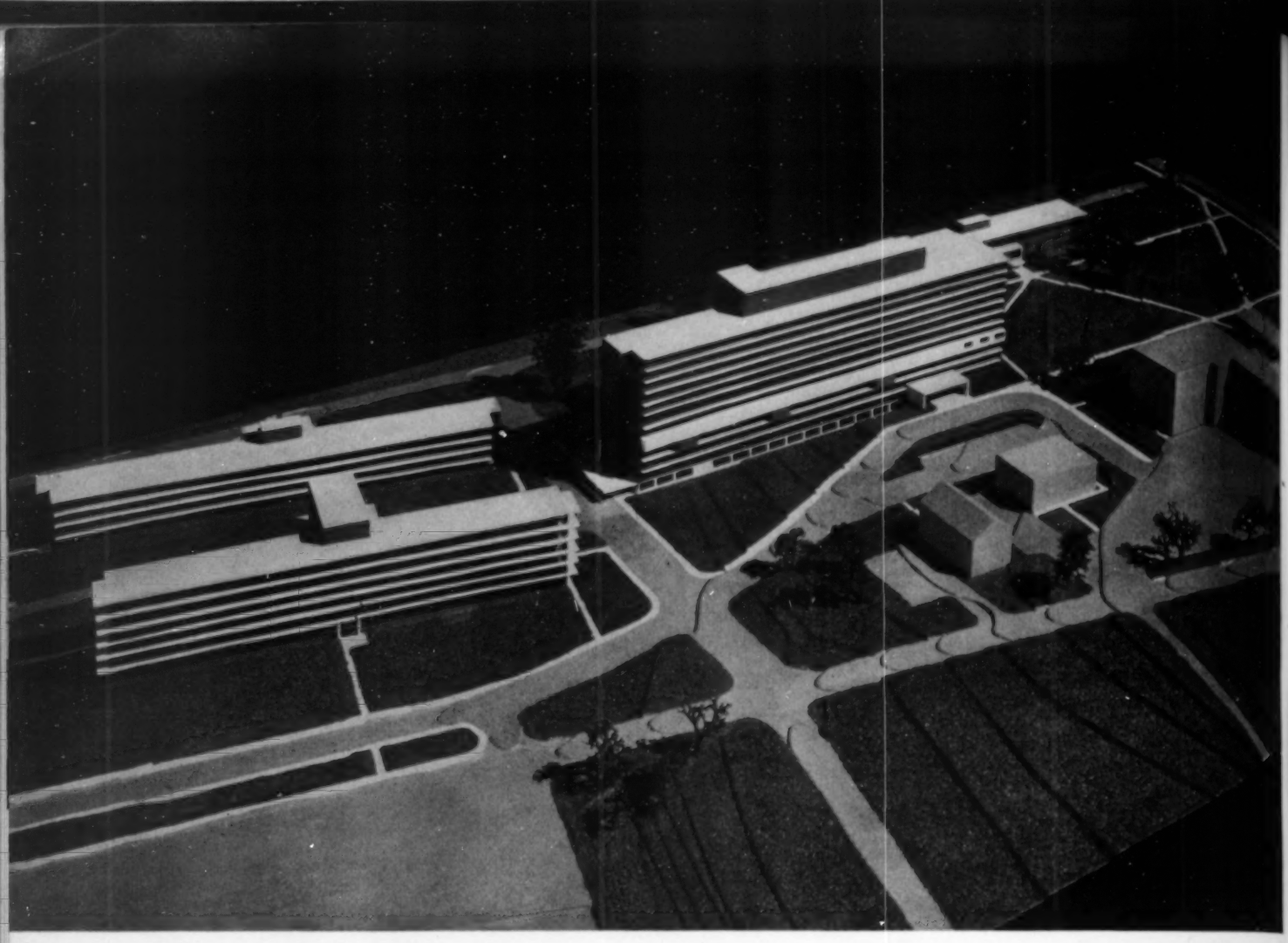
The administration of the various buildings in the program is under separate college or state departments, but all will be a closely coordinated part of the Medical Center. The University Hospital will provide food from a central kitchen and make its laboratories, Physical Medicine Department and operating rooms available to the staffs of other hospitals. These in turn will add several hundred patients to the number available to the University for teaching and research. The net cost per bed for all the agencies is considerably lower than it would be if each were required to have completely autonomous service facilities.

Plan of University Hospital

The University Hospital, the first element of the program to go into construction, is a single line building with ground floor and 11 stories. The width of the building was determined by conditions on a typical nursing floor. Operating rooms, however, requiring greater depth, resulted in the operating floor projecting 4 ft. beyond the line of the building, or to the limit of the

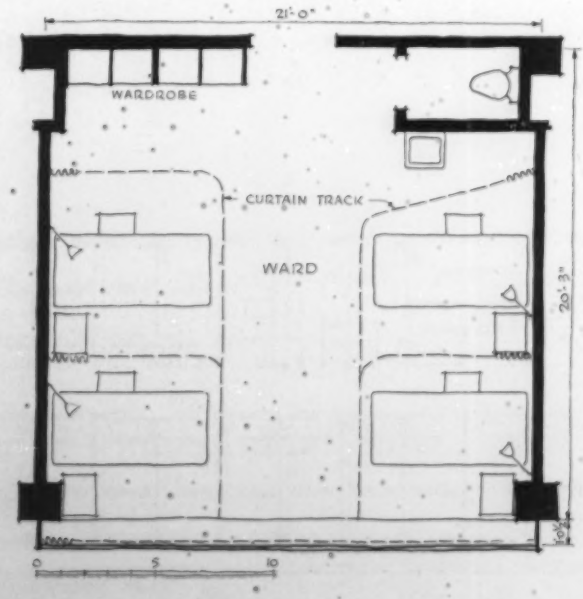
One of the nursing unit floors in University Hospital

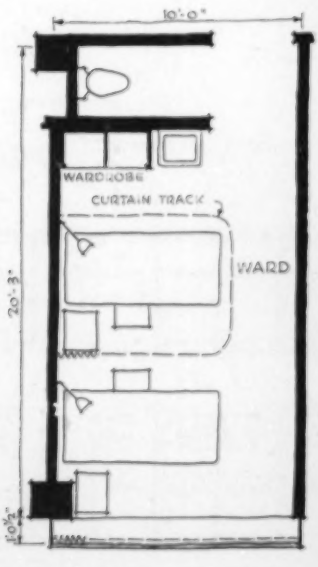


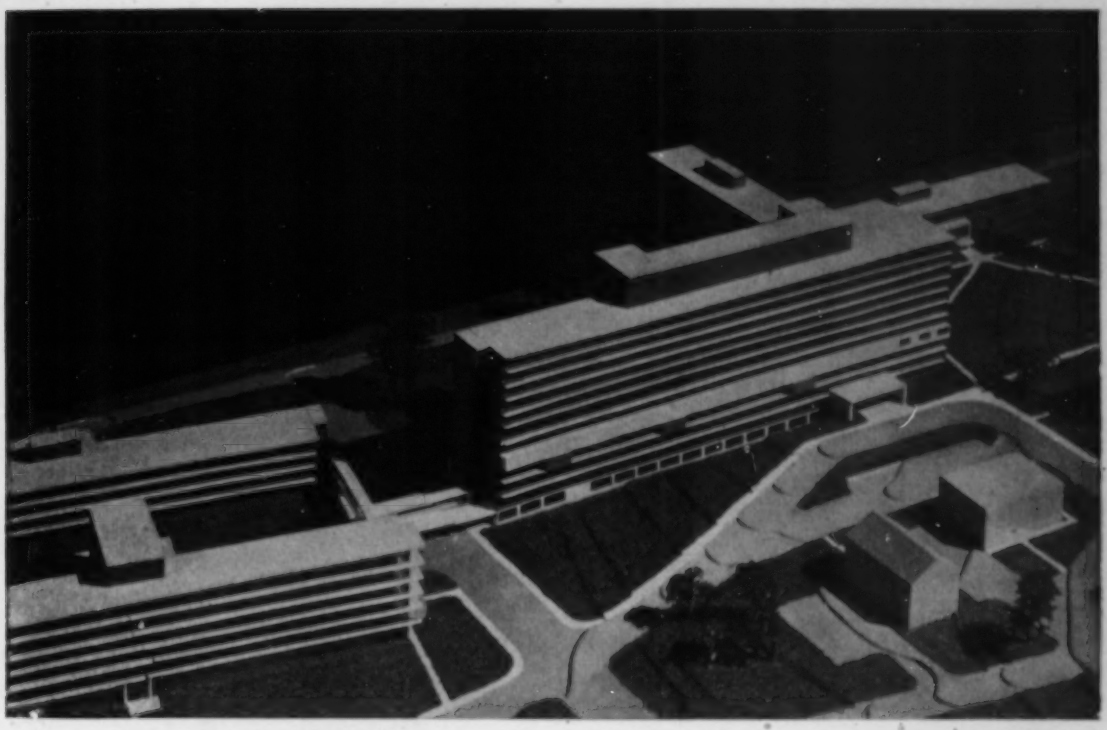


sunshade. The length of the building was determined by the typical nursing floors consisting of three nursing units of approximately 30 beds each. Except for a few rooms for certain patients to whom light and sun would be detrimental, the majority of wards run continuously along the south side of the corridor. This straight alignment of wards, with the three nurses' stations placed on the opposite side of the corridor at equal intervals, permits flexibility in assignment of beds to each station allowing the work to be equalized by amount of care rather than by the number of patients in a unit. Beds are proportioned on the basis of approximately 11 per cent in single rooms, 50 per cent in double rooms, and 39 per cent in four-bed rooms.

Administration, central kitchen to serve meals to the entire group of buildings, laboratories, physical







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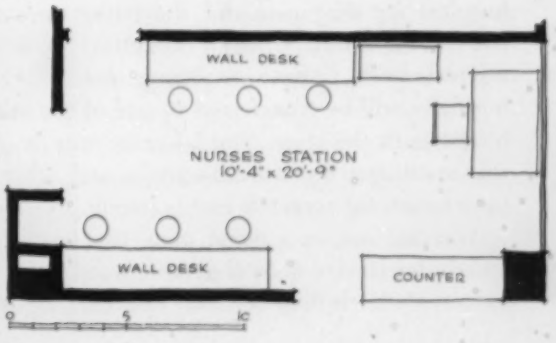
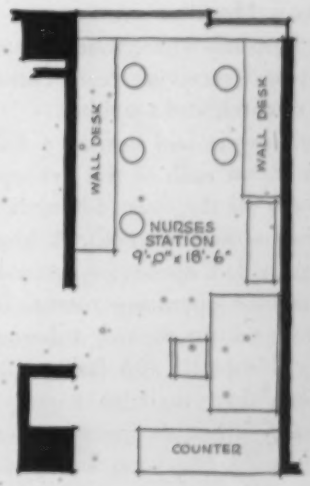
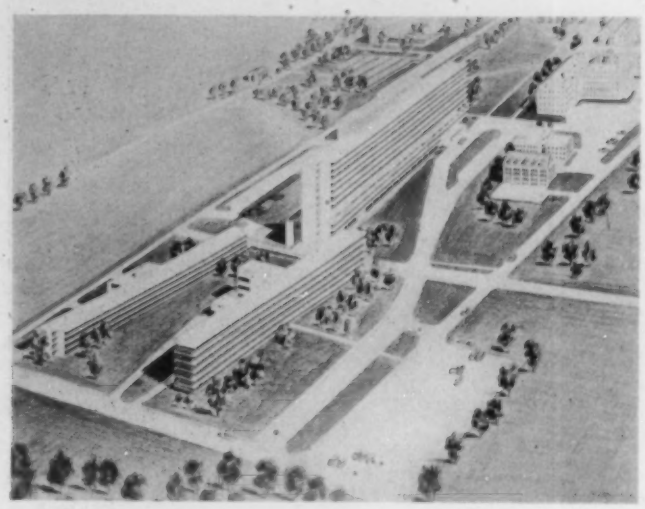
therapy, radiology departments, all of which will give complete service to the general hospital patients, are located on the lower floors, accessible to students and patients from adjacent hospitals without passing through the hospital wards. The upper eight floors are surgical, obstetrical, typical nursing, and isolation floors. Plans for the 11-story Research Clinic building contemplate a connection at each of the nursing floors in order that research may be carried out adjacent to the type of patient under consideration.

Plan of the Dental Building

This building, also now under construction, with full ground floor and three stories, is designed to take a future fourth floor for expansion. There are two major entrances, one primarily for out-patients, the second for students and staff. The latter will lead into the future Out-Patient Clinic and Research building which will connect and serve both the Dental College building and the University Hospital. One 60-chair general clinic is provided on each of the two lower floors in addition to specialized orthodontia, oral surgery, and post-graduate clinics on upper floors.







Plan of Tuberculosis Hospital

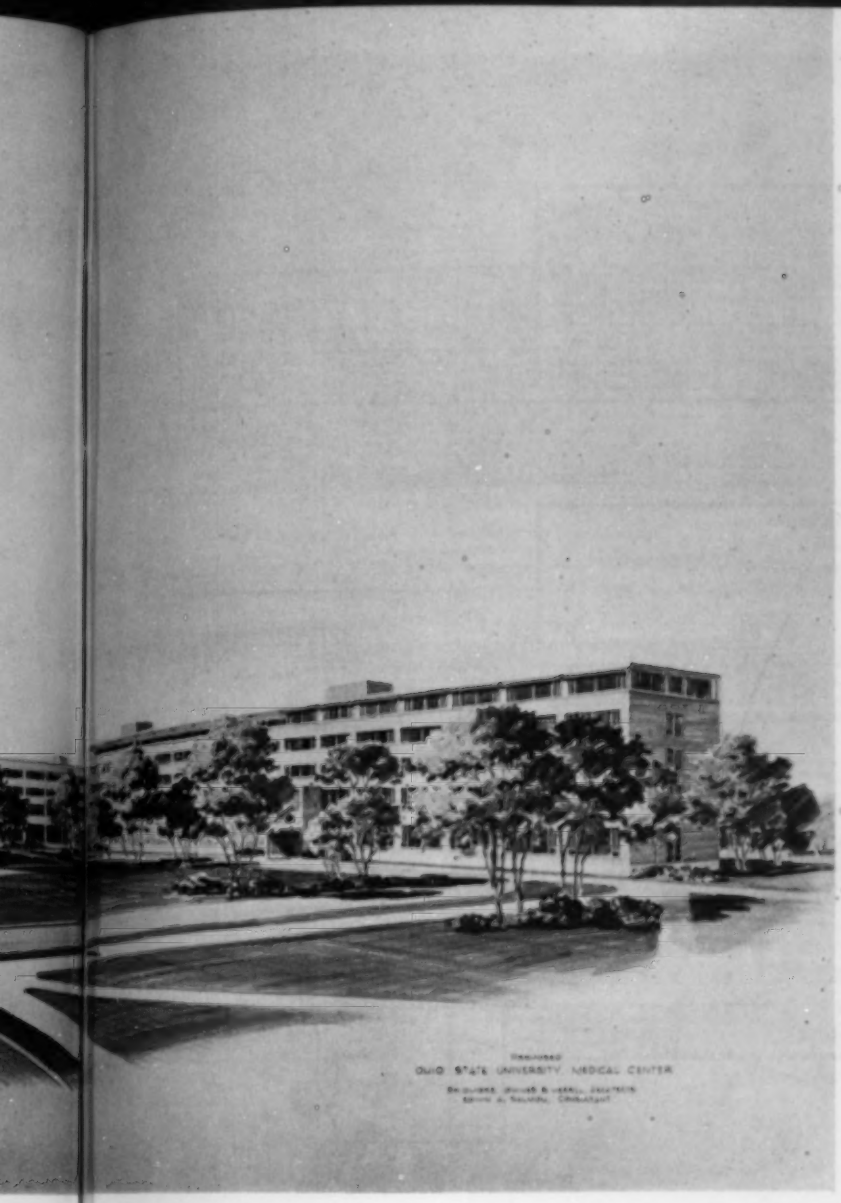
The Tuberculosis Hospital, under the State Department of Health, will become a center for advanced research, special diagnosis and therapy, and treatment of acute cases. It will function as a part of the statewide Tuberculosis Hospital organization, referring patients to other hospitals throughout the state for extended treatment and receiving from them specially selected cases for research and teaching.

The building is laid out on a linear plan with two nursing units on each of the five upper floors with patients' rooms on the south for sunlight, and utility and service rooms on the north. A north wing, centrally located, provided space for special departments, including its own operating rooms, to avoid possibility of contamination by moving tubercular patients to the University Hospital, and its own specialized laboratories. Each floor includes a suite with fluoroscopic equipment in which the pneumothorax procedure may be accomplished. Provision is made for all material such as food carts or laundry to be sterilized before leaving the building. Each nursing unit contains a day room with an outdoor porch in addition to the sun deck on the third floor. A future tunnel connection is planned to the State Department laboratories located close by.

Plan of Receiving Hospital for Mental Patients

This hospital, under the State Department of Public Welfare is, as its name implies, primarily a receiving hospital for diagnosis and short-term treatment. Patients are admitted on a voluntary, emergency, or referral basis. Those requiring extended treatment normally will be transferred to one of the other mental hospitals in the state. Special cases may be referred to this institution by other hospitals, and other cases will be retained for research and teaching procedures.

Also laid out on a linear plan, this hospital contains an administrative floor and three ward floors above the basement. Each floor contains two nursing units — one



for female and one for male patients. By floors, beds are allocated to mental cases requiring also medical and surgical care, "quiet" cases, and "disturbed" cases.

Special Features

The design and equipment of all buildings are based on latest developments in hospital procedures. Oxygen and suction outlets provided in each room in the University Hospital and in medical and surgical wards of the Tuberculosis Hospital will make treatment safer and more effective. Student laboratories are provided on each floor of the University Hospital for teaching purposes, and are connected to the central pharmacy by a dumbwaiter system.

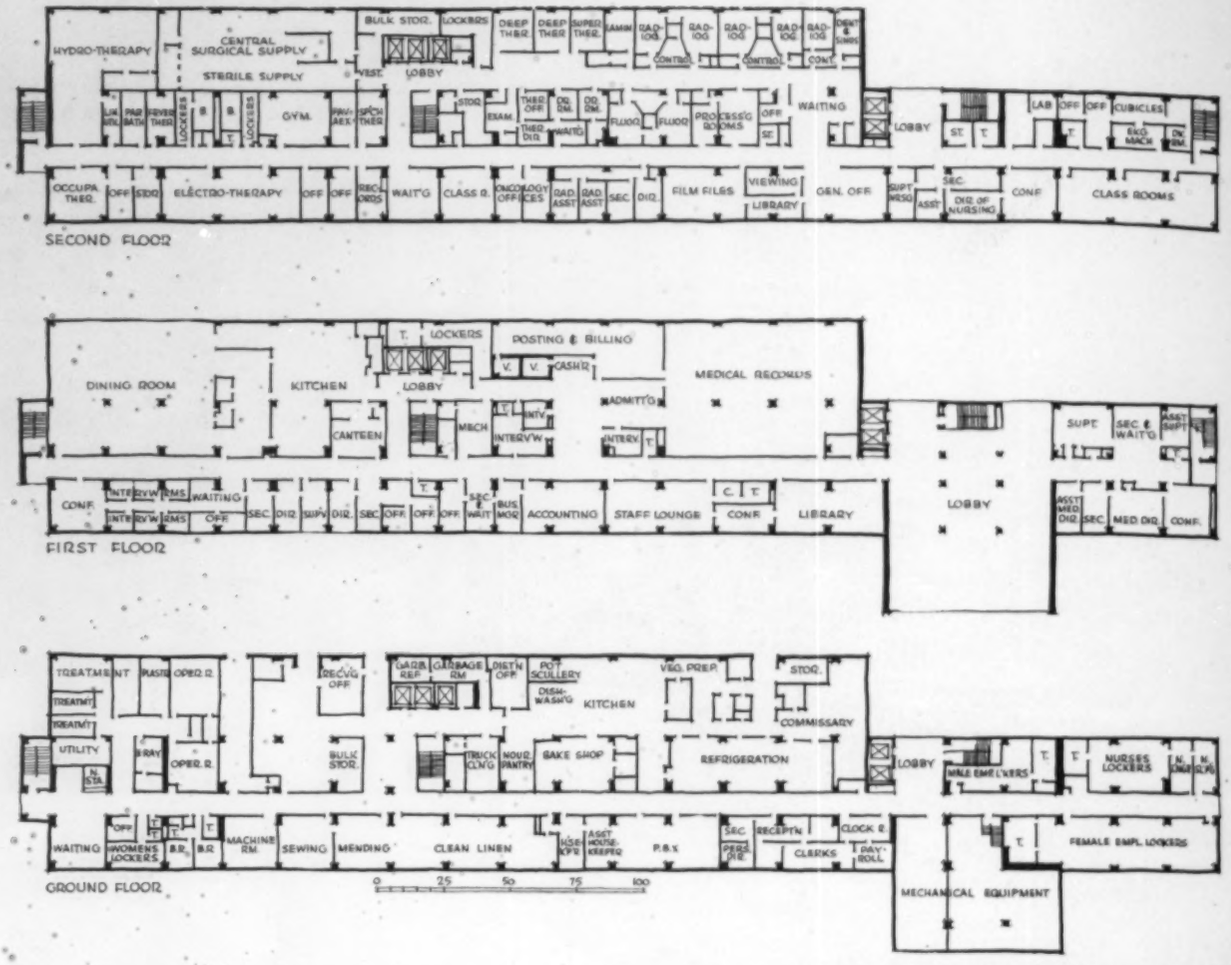
Each room on the nursing floors of the University Hospital will be equipped with a sub-utility room, permitting each patient to retain in his ward certain of his own equipment such as bedpans, thus minimizing chance of infection and reducing nurses' travel.

On the operating floor is a clinical pathology lecture room with an observation panel into one of the 12 operating rooms. One operating room is equipped with louvers in the ceiling through which color movies may be taken. This method of exhibiting operations permits editing and selection of material, well planned lectures by use of a dubbed-in sound track, better observation by means of telescopic lenses, and reusing pictures of significant operations.

Another special feature is a storage vault for radioactive isotopes.

Structure

The buildings represent a direct contemporary design leading toward achieving smooth functioning, design simplicity, and structural economy. A completely symmetrical column system resulted in substantial economy in structure and logical modules for the nursing unit floors. Certain laboratory facilities are housed in extensions to the north of the three hospital buildings where planning could be carried out without regard to



Space allocation diagrams of the facilities and

the column spacing in sections housing nursing units.

Consideration was given to a welded steel structural frame, particularly in early stages of the planning when a 15-story University Hospital building was considered. The final design for a ground and 11-story building, however, is well within the limits of reinforced concrete construction which has effected a material saving in the cost of the frame. It is a completely fireproof frame using a metal pan concrete joist system. Foundations are partly on spread footings and partly on piles made necessary by a variation in subsoil conditions and the necessity of spanning over a major city sewer.

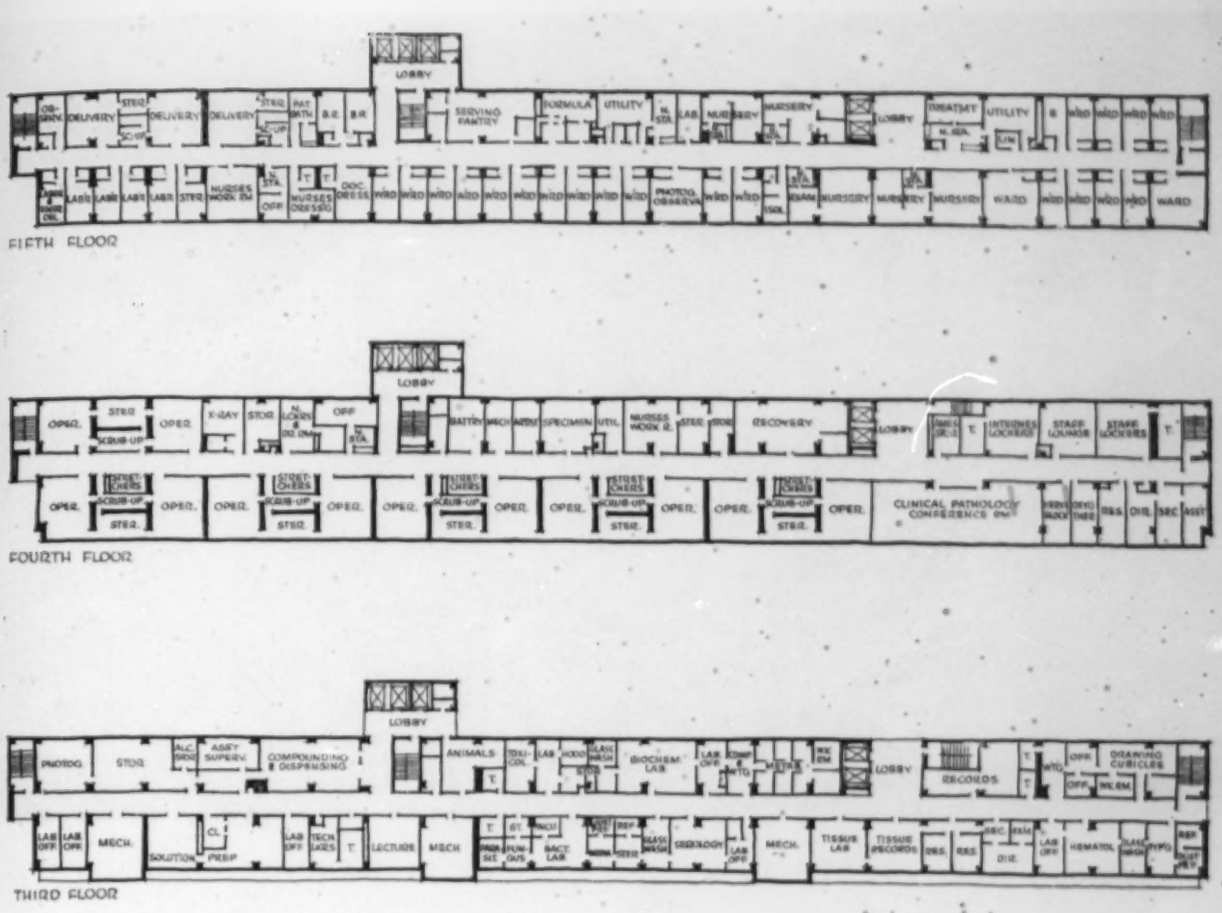
The curtain walls supported by the concrete skeleton are of brick conforming to brick generally used throughout the campus.

Mechanical Equipment and Service

High pressure steam is provided from the University central boiler plant to all buildings where it is distributed at appropriate pressures for sterilizers, hot water converter for heating and domestic hot water and for steam turbine drives of certain equipment. The buildings are heated by radiant ceiling panels with individual room control supplemented by high temperature convectors in service rooms and other spaces where panel heating is not appropriate. Radiant heating has several distinct advantages: one, it was possible to make the building approximately 2 ft. narrower because the space for recessed convectors on the outer wall was eliminated; two, operation is much cleaner than any other system, therefore making it an ideal type of heating for hospitals; three, operating cost is much more economical over a period of time.

Air conditioning is provided for the operating suites, emergency suites, delivery rooms, nurseries and animal rooms. In all of these cases, there is no recirculation of air, thus lessening danger of infection from airborne sources. Mechanical ventilation is provided for spaces where natural ventilation is not adequate. The ventilating and air conditioning systems use an electronic precipitator combined with mechanical fabric type air filters, all in the air supply system.

Electric power is provided from the University central power plant at 2400/4160 volts and is reduced by transformer banks to 480 volts for distribution through the buildings. The 480 volt current is reduced by dry type transformers at load centers for the four-wire, 120/208, three-phase distribution to outlets. Circuit breakers



utilities floors of the University Hospital

are used throughout rather than fuses. An emergency battery source of power is provided with automatic throw-over switches for operating room lights in case of power failure. This is supplemented by a diesel electric generator with a manual cut-over to relieve the battery installation for emergency power serving not only the operating rooms but the emergency circuits providing power to equipment essential to the operating of the hospital including a portion of the elevators. Lighting in general is incandescent combined with fluorescent lighting for certain laboratories and offices. In general, all mechanical equipment providing essential service to the hospital is equipped with duplicate motive power, electric and steam turbine.

Food Service

The central kitchen in the University Hospital with a capacity of approximately 5000 meals per day will prepare bulk food for all hospitals. This is transported in heated food carts by dumbwaiter to the floor kitchens in the same building and by elevator to a cafeteria kitchen serving the staff dining room on the first floor. Food will be transported to the Tuberculosis and Receiving Hospitals by heated food carts through the tunnels to these buildings and thence by service elevator to a floor kitchen serving each pair of wards.

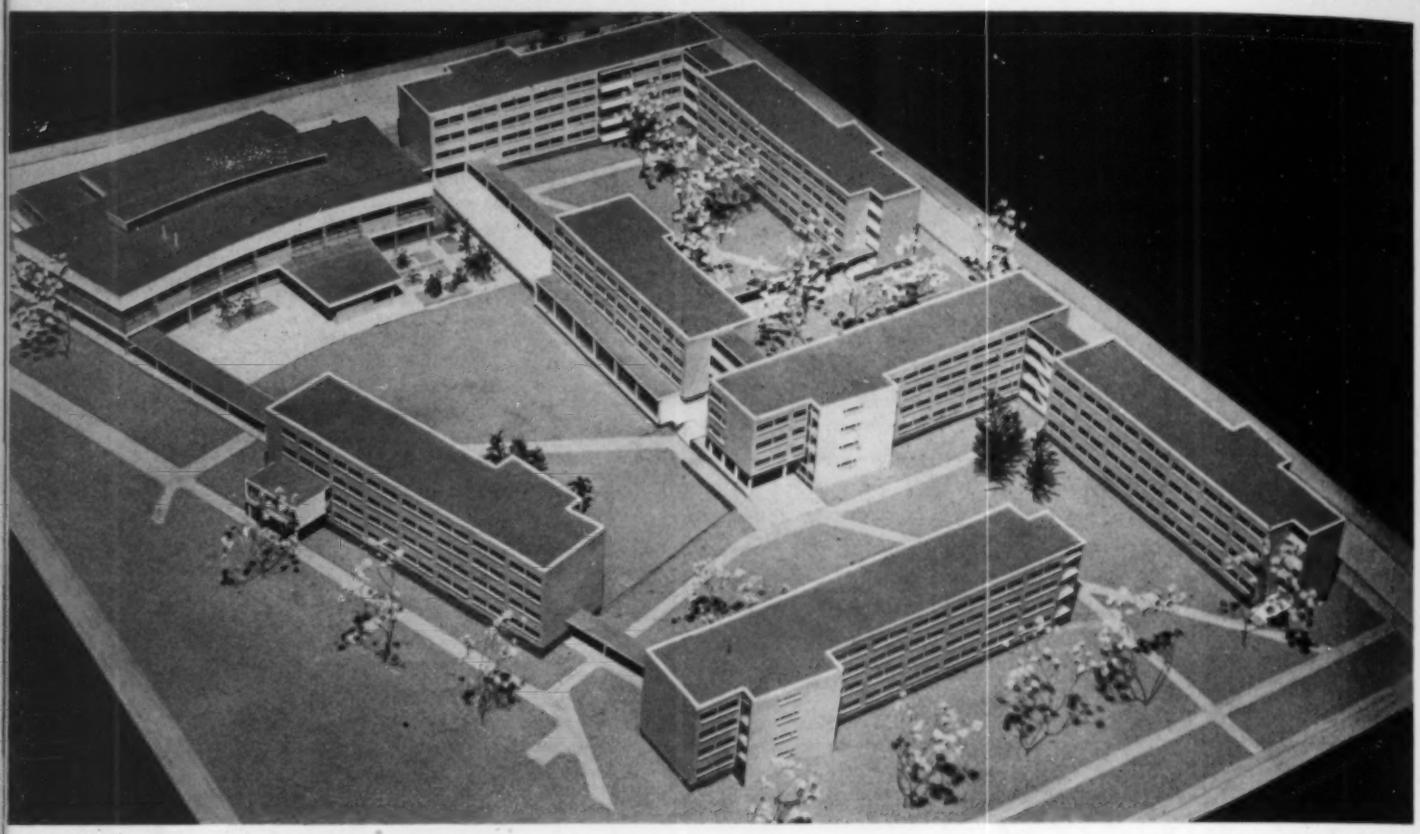
Elevators

Elevators are electric cable suspended throughout, standard hospital size in the hospital buildings. The elevator system is supplemented by two special size dumbwaiters for food service from the main kitchen to the floor kitchens in the University Hospital, and dumbwaiters from the pharmacy to the laboratories. The Tuberculosis Hospital has a special service elevator to be used for contaminated waste material exclusively, terminating in an incinerator room in the basement. The east bank of elevators in the University Hospital is so located as to be increased from two to four with the construction of the Research Clinic building.

Laundry Service

Laundry from all buildings will be handled by the University central laundry. All laundry from the isolation ward in the University Hospital and from the entire Tuberculosis Hospital will be sterilized before leaving the building.

Each building has its own incinerator.



HARVARD REAFFIRMS AN OLD TRADITION

Proposed Graduate Center, Cambridge, by Walter Gropius and The Architects' Collaborative*

HARVARD'S "YARD" has long been the envy of other American universities, for its fine historical buildings, its generally coherent atmosphere. Harvard's example has been cited in opposite ways: in favor of copying the fine old structures to get buildings that "match," and in favor of contemporary innovation, to get the enriching contrast that exists among such Harvard halls as sober, 17th-century Massachusetts Hall, Bullfinch's University Hall in 18th-century Georgian, and Richardson's 19th-century Sever Hall, which is pure Ruskinian, each contemporary to its time.

In projecting her Graduate Center, Harvard herself has chosen to try for an innovation like Richardson rather than to continue "matching" as she has during three decades; she has found her man in one of her own graduate schools, teaching. His name is Walter Gropius.

In October, President Conant announced plans to complete the Center in 1950, at an estimated cost of $3,000,000, to house 600 graduate students and dine 1000, besides providing meeting rooms and recreational facilities. The Harvard Corporation has offered land and maintenance for the entire project, plus $1,000,000 for a commons hall, conditional upon the successful raising of the balance by alumni or schools concerned. (The new Center will house 600 single students attending at the Law School, Arts and Sciences, Design, Divinity, Education, Engineering, and Public Administration. Existing facilities, housing another 450 students, are to be refurnished and integrated with the new group.)

Confident that required funds will be raised, the University already has approved preliminary plans by Gropius and his younger associates of The Architects' Collaborative. Not only is this a rare example of a university in America turning to its own teaching staff for its own development, but there was also participation in the making of preliminary studies by third-year graduate students.

The purpose implied is in keeping with remarks of Joseph N. Hudnut, dean of the Graduate School of Design, on the Architecture of the Yard:

"The notion that Harvard's tradition is in some way integral to the eighteenth century and can be expressed in Georgian terms [is an] illusion. . . . The great

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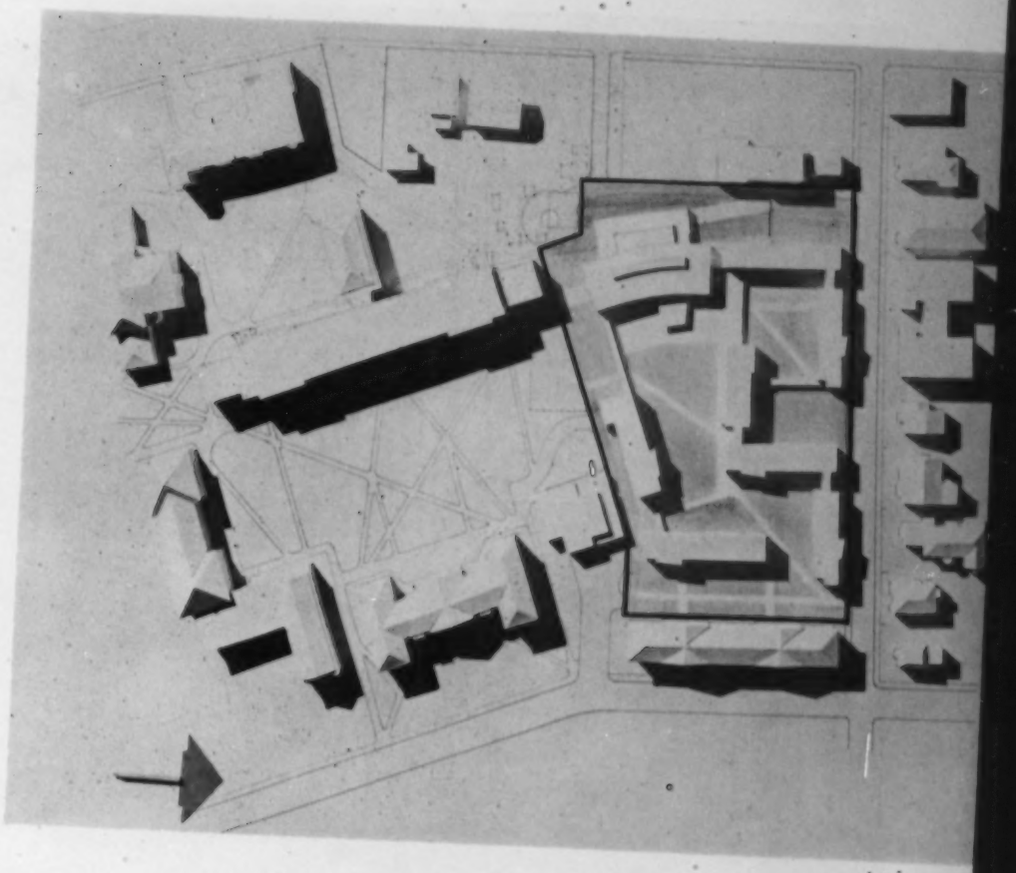
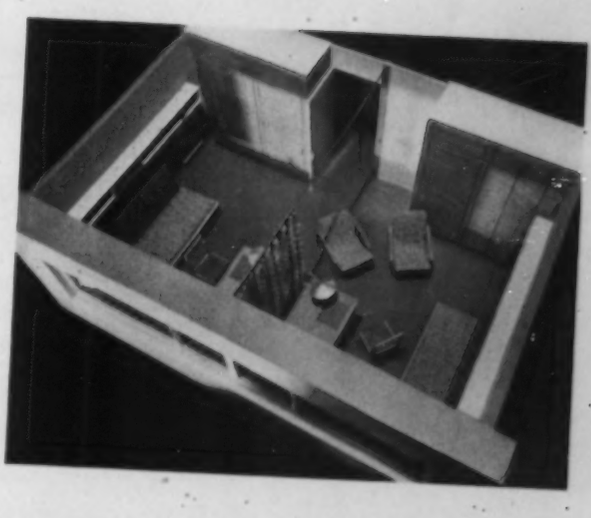
*Other Members: John C. Harkness, Norman Fletcher, Sarah Harkness, Jean Fletcher Benjamin Thompson, Louis A. McMillen, Robert S. McMillan



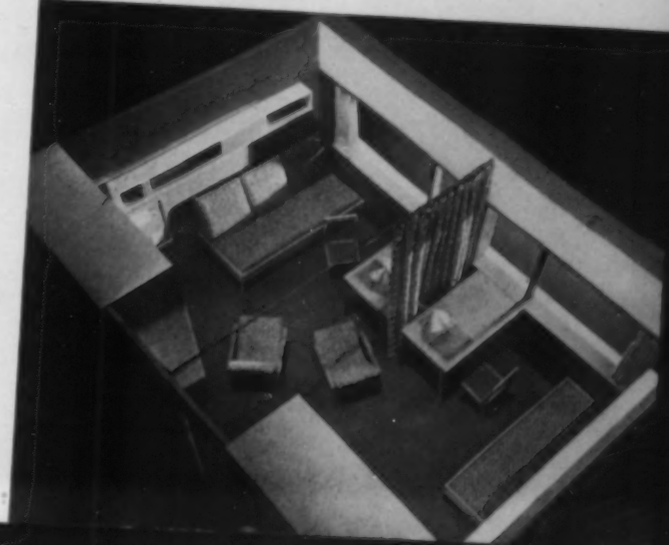
Detailed model (across-page) shows new buildings for Graduate Center, to occupy area enclosed in outline on site model (this page). New commons building (upper lefthand corner, opposite page) will dine 1000 students and provide meeting rooms and recreation. Dormitories will house 600 students of graduate schools. (Existing dormitories, now housing 450 students, will be refurnished.)

The new residential buildings will occupy Jarvis Field, at the north end of Harvard, now occupied by quarters for married couples in process of graduating.

In the site model on this page, the small buildings to the right of the proposed Graduate Center are private homes; other buildings, to left, belong to graduate schools, the largest being Langdell Hall (Law School)



In design of dormitory rooms the chief aim was to make possible rearrangement either by screens, as shown in model pictures at right, or by future lightweight prefab partitions. Each student will have a desk, desk-chair, couch-bed, dresser, closet, bookshelf and a 7 by 4 ft. window



periods of Harvard surely lie in the seventeenth and nineteenth centuries. . . . The three buildings, Massachusetts, University, and Sever, representing respectively the seventeenth, eighteenth, and nineteenth century, have an unmistakable harmony which arises, not from materials, proportion, and decorative trim, but from a unity of intention and of method. In each, the pattern is developed from the thing to be done and from the idea to be expressed. That is the satisfying tradition of the Harvard Yard."

THEATERS

ARCHITECTURAL RECORD'S BUILDING TYPES STUDY NO. 143

A NEW ARCHITECTURE FOR THE MOVIE THEATER

Raymond Loewy Associates

THE moving picture theater, now just about entering its second generation, looks to be due for some changes. The new generation will have to improve on the old, or the race may find itself dying out.

For science is right now giving the movie industry its worst scare since the movies began, with television making movie patrons "stay home in droves." The theater will have to, and should be able to, enlist science in its own behalf, and there are indications of important changes in the concept of a theater.

These changes should prove to be directly within the bailiwick of the theater architect. They certainly will not be mere dolling up of the theater; in fact they will probably be strictly in the functional order. And the progressive architect, with his eye on purpose and with science at his elbow, should be just the man for the job.

The basic weapon of the theater is "theater". The race with television will eventually settle down to a matter of real entertainment values, of dramatic impact of offerings, of intensity of illusion created.

Here the theater is still out in front of television. Its task is to remain ahead, to heighten its dramatic quality, to lure the television owner out of his home for better entertainment value.

So far the television set provides sight and sound, but not much "theater." It has caught on and is rapidly gaining new converts, but it is still an amazing new scientific toy. One still sits in a living room, amidst all the distractions of the home, and sees his show on a little screen. It is fine for sports and news events and perhaps style shows, but not for dramatic entertainment. As one man said recently, "I bought a television set almost a year ago, and hadn't been to a movie since, until last night. I guess I had forgotten how good the movies were."

Well, the movies are good, but they will have to be better. And while much of the improvement will have to come from Hollywood, the final battle will be in the local movie house, which must be redesigned for a better dramatic value.

To Free the Movie Art

Suppose, for example, that the movie industry were to accept a progressive suggestion that comes from the theater architect, Ben Schlanger. He points to the restrictive effect of a picture always of the same proportions, the same size, always seen in a dark frame. Why not, while reaching for dramatic impact, break completely away from this photo-album prison, and make the screen a fluid medium of art?

One step he suggests is to increase its size; it could easily be made 20 or 25 per cent larger. Already, it will be noted, there is a major change for the theater.

The larger screen would not mean simply a larger frame. The frame would be eliminated. In making the picture, the cinematographer would assume freedom within the larger area to use whatever picture size — or picture shape — best suited his subject matter. He

might spread his picture to full width for a great mob scene, or for a chorus line. He might vignette a more intimate scene at relatively small size. The canvas broadens or closes in, brightens or darkens with its subject. Or the scene might move across the screen area to heighten the illusion of motion, which now is achieved only by having the background in motion.

To understand the effect on the theater itself, it is necessary to look into the vignetting idea. A year ago Ben Schlanger told the Society of Motion Picture Engineers:

"For the motion picture, where it may be better to present more realism, the vignette may well be a suitable representation of the peripheral portion of our field of vision. In real life there is no opaque masking frame in front of us all the time. The vignette is more like what one experiences visually.

"In still photography the vignette commonly fades to pure white at the extreme edges of the picture. This type of vignette would prove disturbing for the motion picture because of the competition created by stronger light at the edge. The vignette recommended here is one that diminishes the light value toward the edges of the picture. Light and color values seem to dim out in the visual peripheral. Colors do not change in hue, rather they seem to become grayer. The reduced light value proposed for the peripheral vignette is also the means of creating transitional light intensity between the bright picture and the picture environment. . . ."

Schlanger has even considered that the vignetted light might extend beyond the screen itself to the surrounding surfaces in the theater. Obviously, then, we should need something different from the gargoyled proscenium arch of the first-generation movie house.

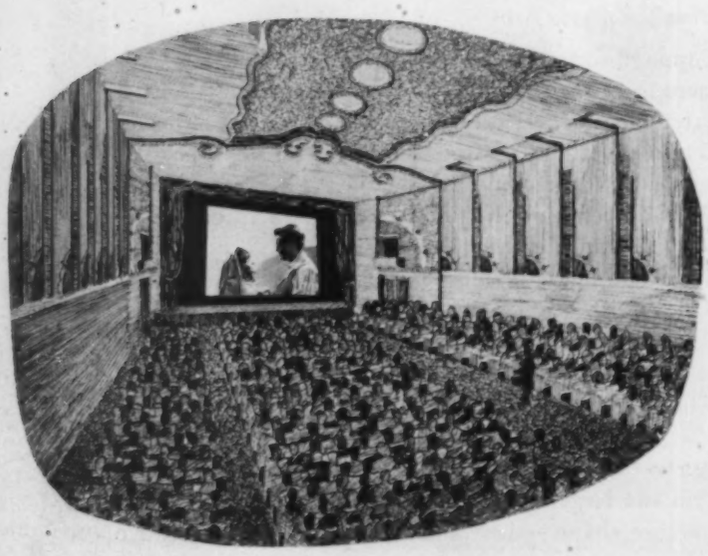
The lighting of the screen surround is an immediate problem, not waiting for the adoption of Schlanger's idea of vignettes. And so is the architectural phase of the auditorium as a housing for dramatic entertainment.

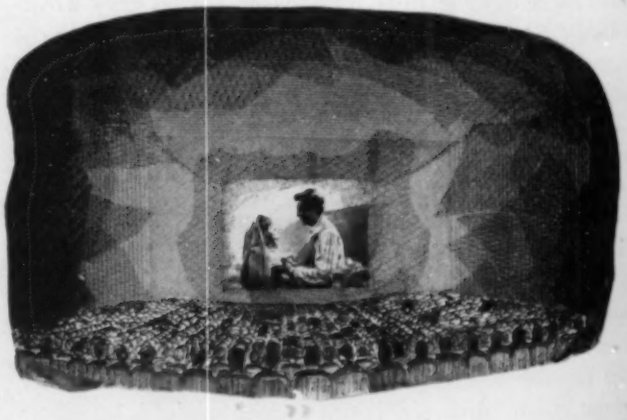
A florid architectural style only competes with the illusion on the screen; here certainly is a place for modern functional design.

Its functionalism might begin with a better surround for the screen, one which would contribute toward the solution of a really pressing lighting problem. Experts have told the RECORD recently that no movie theater in the country is well lighted.

The science of seeing tells us how violent are lighting conditions in the typical theater. The eye dislikes the brightness contrast of the lighted screen in the darkened frame. Schlanger's vignette idea would soften the contrasts around the screen quite naturally. But that could, and should, be done right now, with present films. Schlanger has used textured ribbed surfaces near the screen to pick up light in an automatic relation to screen light values. Another possibility is a dimly lighted background behind the screen and extending beyond it. Still another, presented in this Study (page 145), is keeping the auditorium better lighted while the film is running. The author makes what is really the first attempt to apply scientific lighting to the movie theater. Besides eye comfort, and therefore better illusion, better lighting would also improve convenience, simple safety, and perhaps propriety in the theater of today. Television

In the older theater the dramatic impact is diluted by florid auditorium decorations, by the fixed screen seen as a white spot in a dark frame. Ben Schlanger has suggested a vignetting idea in which the screen becomes fluid, the dark frame eliminated, the auditorium a neutral background. Picture size might be large or small, fixed or in motion, with lighted vignette edges adding dramatic impact





set owners quickly learn not to darken the room completely, for the same reasons. Now perhaps television is telling theater owners something they might well have known long ago.

Acoustics is another major area for theater improvement. And most theaters, while having an adequate level of projected sound, leave much to be desired as to quality, particularly as regards that "intimate" quality of sound which makes it seem to come from the screen. Here again the second generation movie theater, seeking to enhance its dramatic quality, might well profit from the science of auditorium acoustics, which has been developed largely since most movie houses were built. The article in this Study shows how much architectural design is involved in good acoustics, and how good acoustics are achieved.

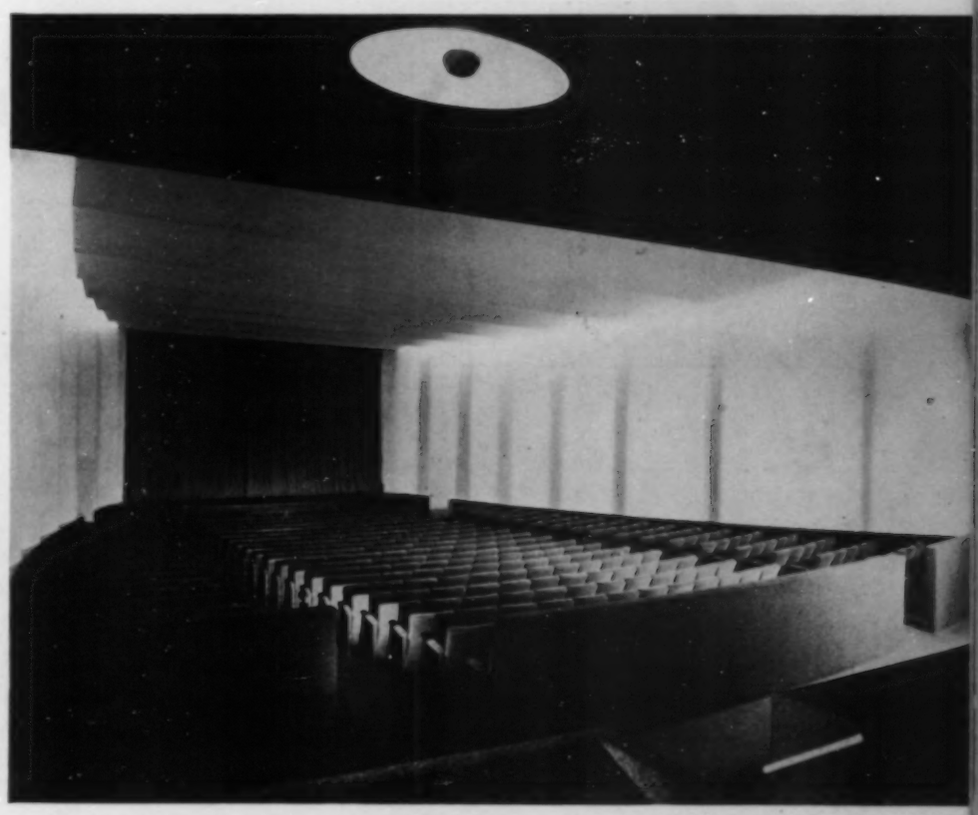
Then, too, science has gone ahead in many other technical matters of design which can make their contribution to better theaters. Sight lines that permit the patron to see the action without being distracted by heads in front, air conditioning to make him unconscious of surrounding temperature conditions or even odors, seating to make him settle back comfortably to be entertained.

In considering the future of the movie theater, some have mentioned its community aspects, in the light of social appeal to lure the family out of the home. They are inclined to cite the social side of the old theaters of Europe, something that is still strong in the opera. Certainly the theater, even the movie theater of the modern age, is associated with "going out." And going out is not to be outmoded by the television set, even though the set in the home is highly regarded as a means of keeping the younger generation off the streets. Probably the younger generation, nevertheless, will be loath to desert the familiar movie entertainment, and perfectly willing to be lured out of the home.

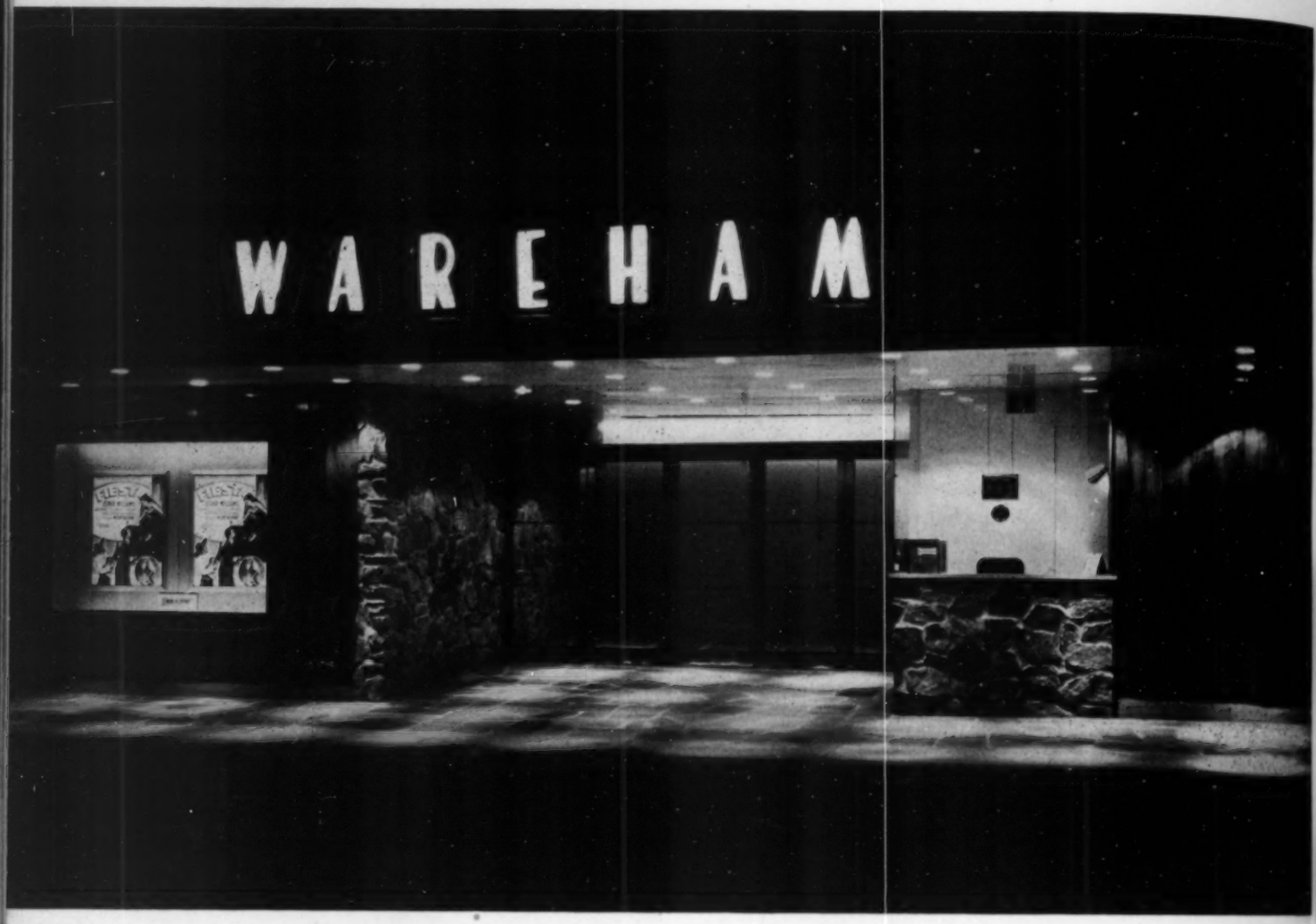
How much of the social side of the theater can be translated into design is not readily discerned. Obviously, however, there are many matters that bear on the appeal to the patron. The cheerful, bright theater marquee has always been a tradition of the theater, is still highly regarded by theater people. It can be vastly improved in design certainly, perhaps also in advertising appeal. The lobby and waiting rooms and washrooms might all be subjected to some scrutiny, now that patrons need to be lured instead of herded into the theater. All of these are clearly related to social aspects of the theater as an institution.

Perhaps also the new science of community planning may offer something to the theater. The movie house is a logical nucleus for an entertainment center that might offer many other varieties of amusement and social activities.

At any rate it is very clear that the theater architect will be giving a newly serious attention to the true function of the theater, and that will lead him into a new consideration of all of the sciences and arts that will add something to the quality of entertainment. The theater owner will be thinking of these things, too; he certainly will get over any idea he may have had that the function of the architect is to design a shell to cover so many seats. He will need the architect as never before.



In general one effective answer of the movie industry to the competition of television is simply better theaters, truly functional in design, using modern technology to heighten dramatic quality of entertainment. Theater in the Museum of Modern Art, New York City, Goodwin and Stone, architects



FACE AND FUNCTION LIFTED

Wareham Theater, Wareham, Mass.

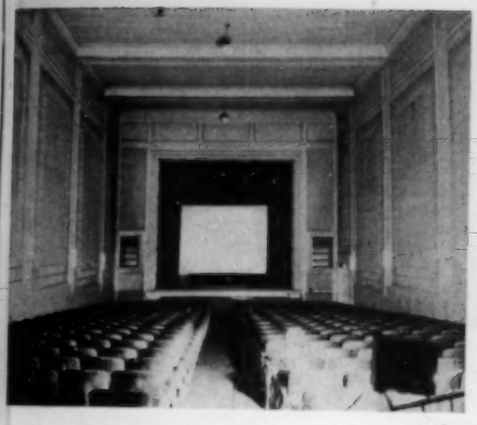
William Riseman Associates, Designers

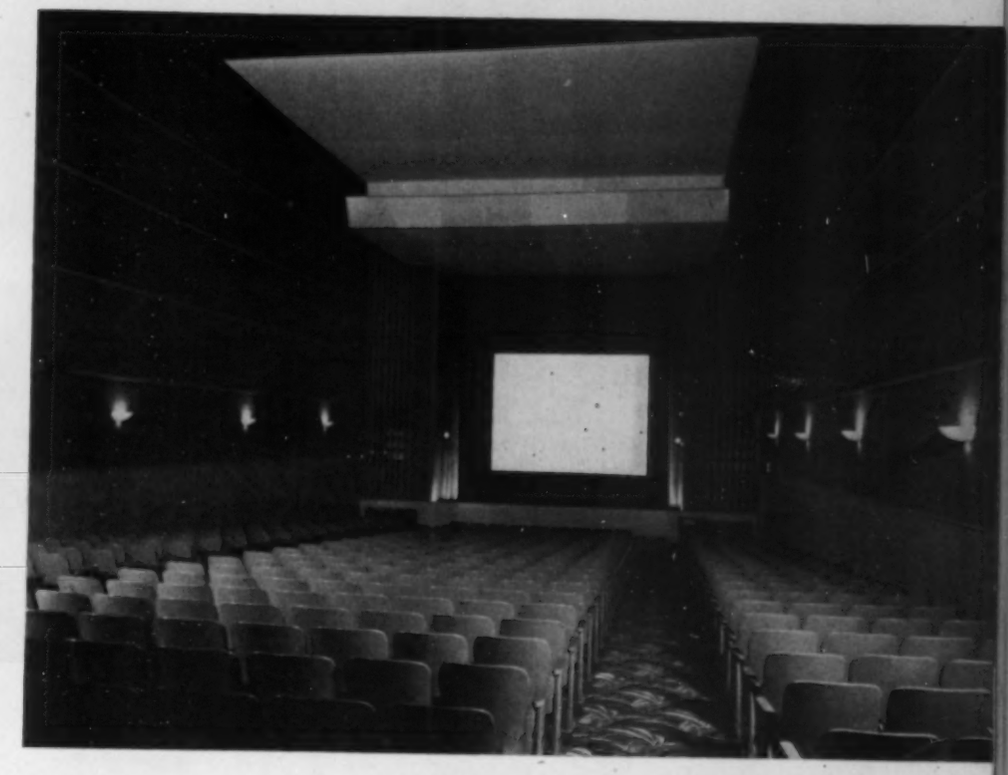
ONE immediate way for the movie industry to lift its face is shown in the three examples of remodeling on the following pages. The "Before and After" story of the Wareham, Strand and Astor Theaters, all redesigned by William Riseman Associates, is a fascinating example of what can be done with little money and much skill to entice the movie-goer when everything else fails.

By scrapping the dreary decorations of the original, superseding them with clean lines, pleasant materials, good lettering and attractive display areas, the designers succeeded in turning a drab local movie into a smart and inviting picture theater. Most successful is the change in the entrance and in the auditorium (see next page). The stairway and passage interior is not quite so interesting in design as the rest. However, the patterned carpet presents easier maintenance problems than a one-color flooring. The whole atmosphere of the theater has been vastly, and profitably, lifted from the banal.

The changes in the auditorium have been less radical than these pictures seem to indicate. The distracting wall decorations have been removed and plain wall surfaces now direct the eye toward the screen. In place of the old and inefficient central-aisle scheme, the designers have provided a two-aisle layout to provide a maximum number of desirable center seats, as well as for better circulation. The lighting appears to be somewhat low in intensity, and not sufficiently general—not a very serious fault in so small a theater

The old Warr Theater façade was removed in its entirety, replaced by the strikingly handsome stone, wood, glass and flagstone entrance at the left





George M. Cushing, Jr. Photos

Recessed ceiling spots turn the entrance lobby into a friendly island of light

George M. Cushing, Jr. Photos

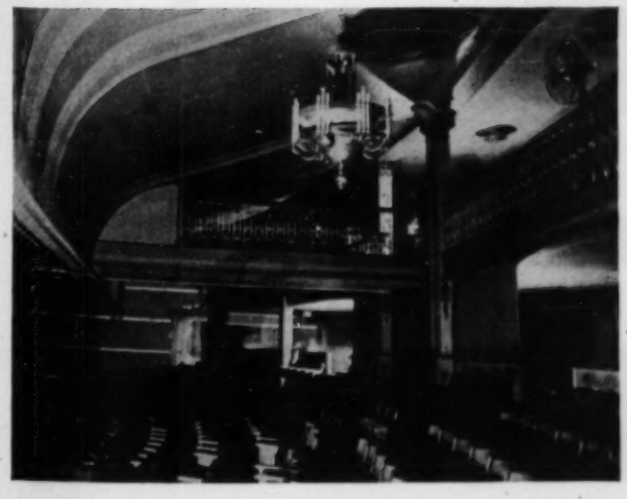
The fascinatingly overdone auditorium (below) turned the stage into a minor side-show. Now the screen is the center of focus, as it obviously should be (above)

MAINSTREET CLEAN-UP

Strand Theater, Hartford, Conn.

William Riseman Associates, Designers

THE Strand Theater in Hartford represents a much more radical overhauling than the small Wareham Theater. While the entrance marquee remains flashy and not too legible, the interiors have been revamped drastically to produce a pleasant and restful atmosphere. Most interesting in this alteration is the change in the auditorium, where a gaudy Arabian-Nights palace was turned into an efficient and simple theater.



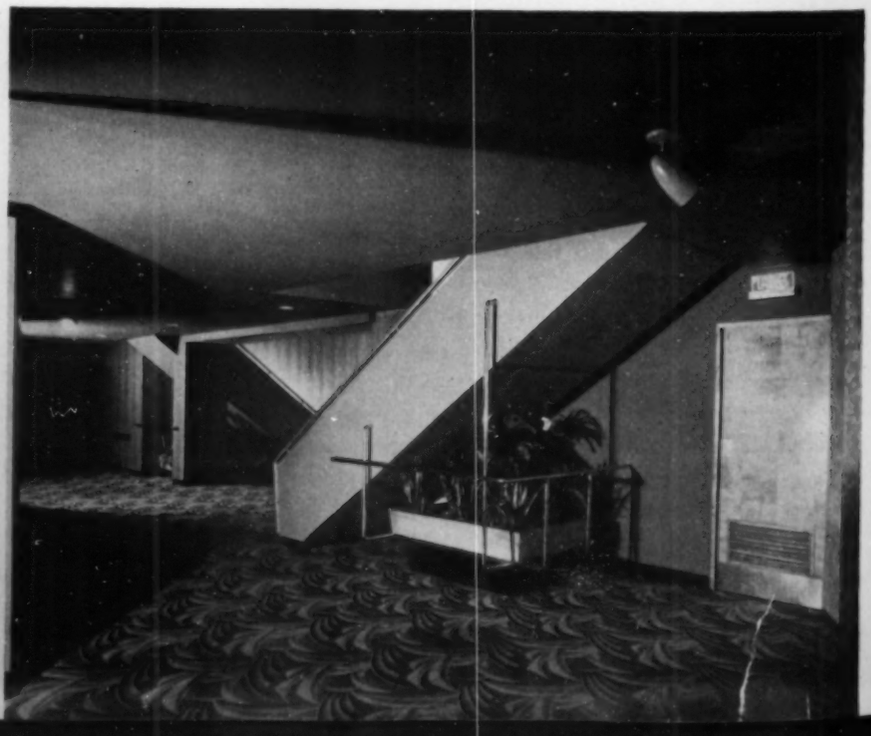
The mezzanine in the rear of the auditorium is now a most striking architectural success. Most successful in this redecoration has been the revamping of the auditorium itself. By cleverly exposing the structure of the building and filling in the mezzanine walls with glass, the architects have achieved a beautiful dramatic effect. But the new setting for the screen, and its subdued lighting, contrasts most strikingly with the former pretentiousness and false "opulence" of this theater. The old Strand Theater might have been almost anything, including a circus. The new Strand is unmistakably a movie theater, and a very good one at that

Despite the continued "brilliant display" of the entrance, the overall design has been toned down and made a little more legible. Note the improvement in display facilities

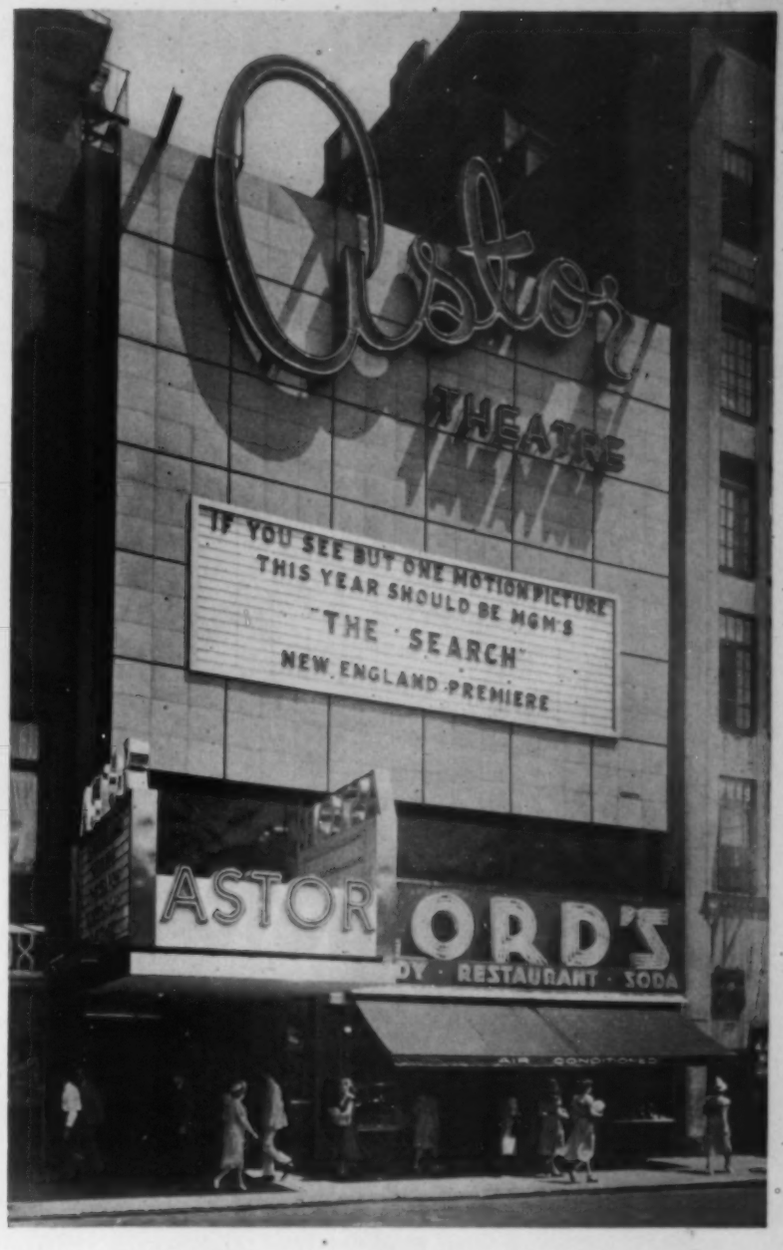
The candy counter (above) is typical of the cleaned-up design, attractive and productive

In place of the gloomy, badly-lit stairs, the designers have provided a handsome access to the mezzanine, inviting rather than repelling

George M. Cushing, Jr. Photos



George M. Cushing, Jr. Photos



Although the lettering problem still remains to be solved, the new entrance is a striking advance over the old "design"

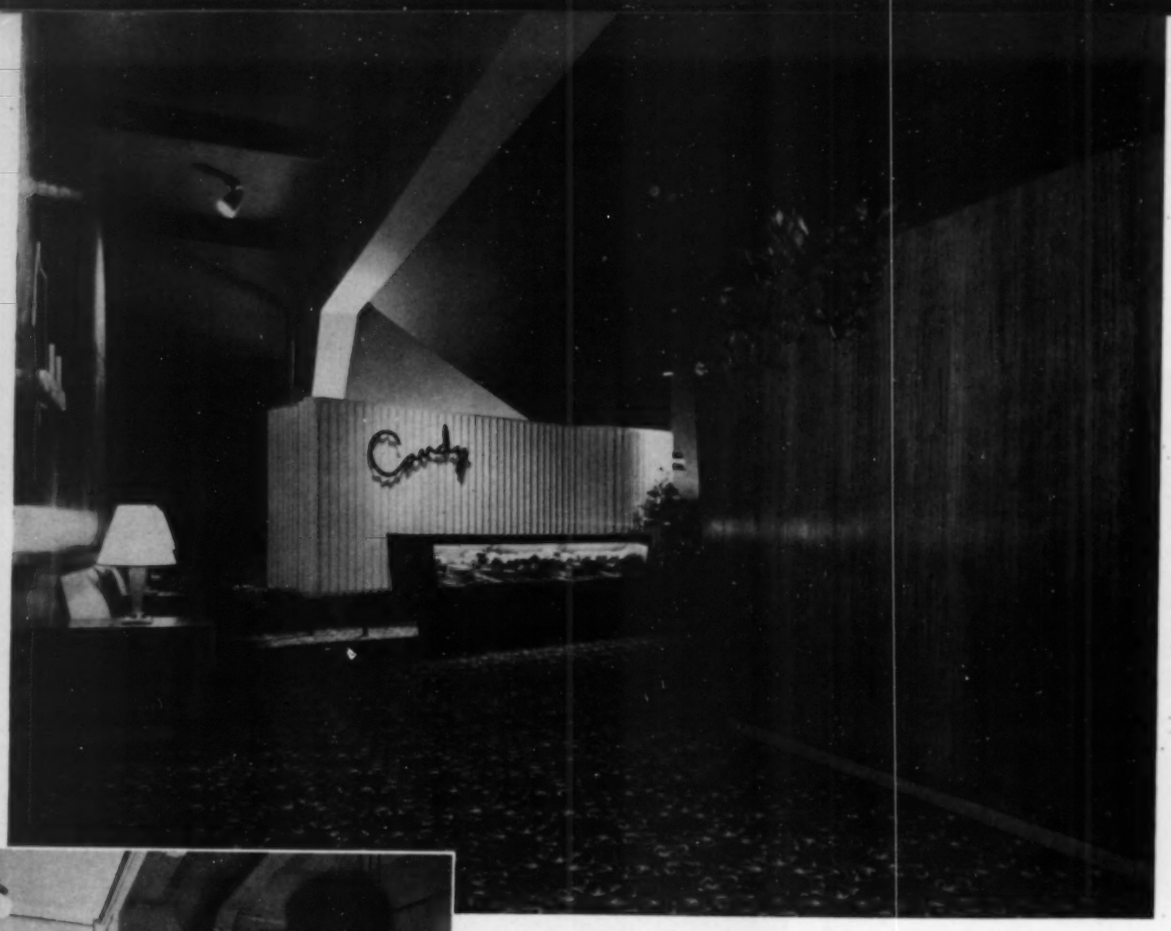
ORDER OUT OF CHAOS

Astor Theater, Boston, Mass.

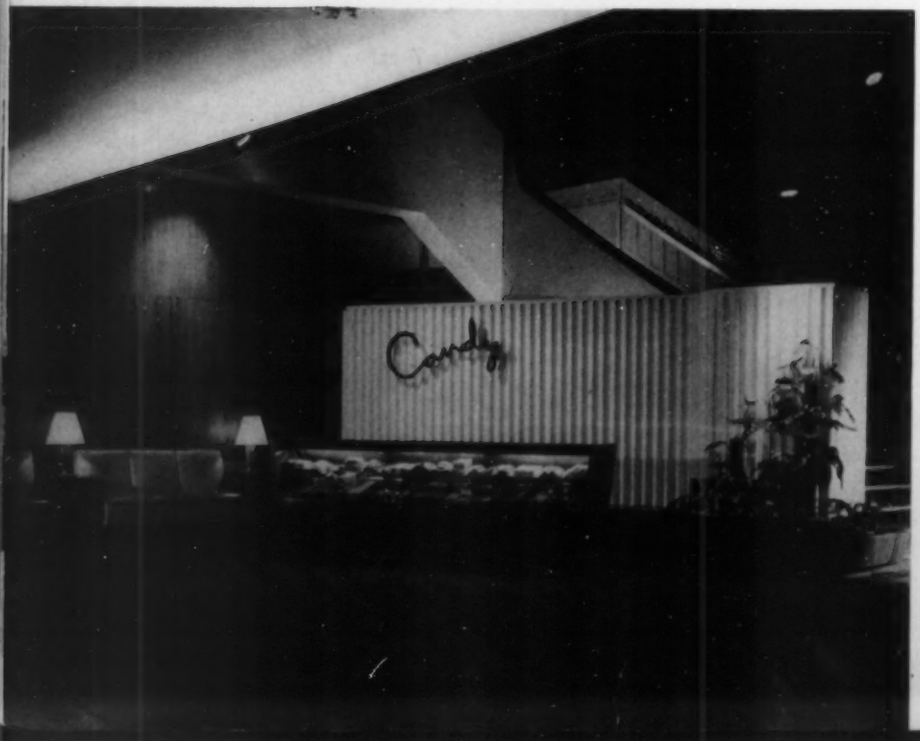
William Riseman Associates, Designers

If you had approached the old Tremont Theater in Boston, in a moment of recklessness, you would have had great difficulty (1) in finding it; (2) in locating its entrance; and (3) in discovering what picture was being shown. In the new Astor Theater such a chaotic condition has been substantially cleared up. The entrance is visible. Its lettering competes moderately well with that of adjoining restaurants, dancing schools and stores. And there is no way of mistaking what movie is being exhibited or where to find the entrance.

How great the change-over has been is clear from the "Before and After" views of the lobby (over-page). It is hard to reconstruct the bleak institutional interior from the photographs of the comfortable new lobby. This remodeling job should be valuable to movie exhibitors in showing what can be done to give both the new look and a new life to even the most outdated and uninviting old picture-house.



The use of fine wood, corrugated transite, indoor planting and subtle lighting makes it almost unbelievable that these two areas are identical. Compare the former candy stand with the new counter



George M. Cushing, Jr. Photos

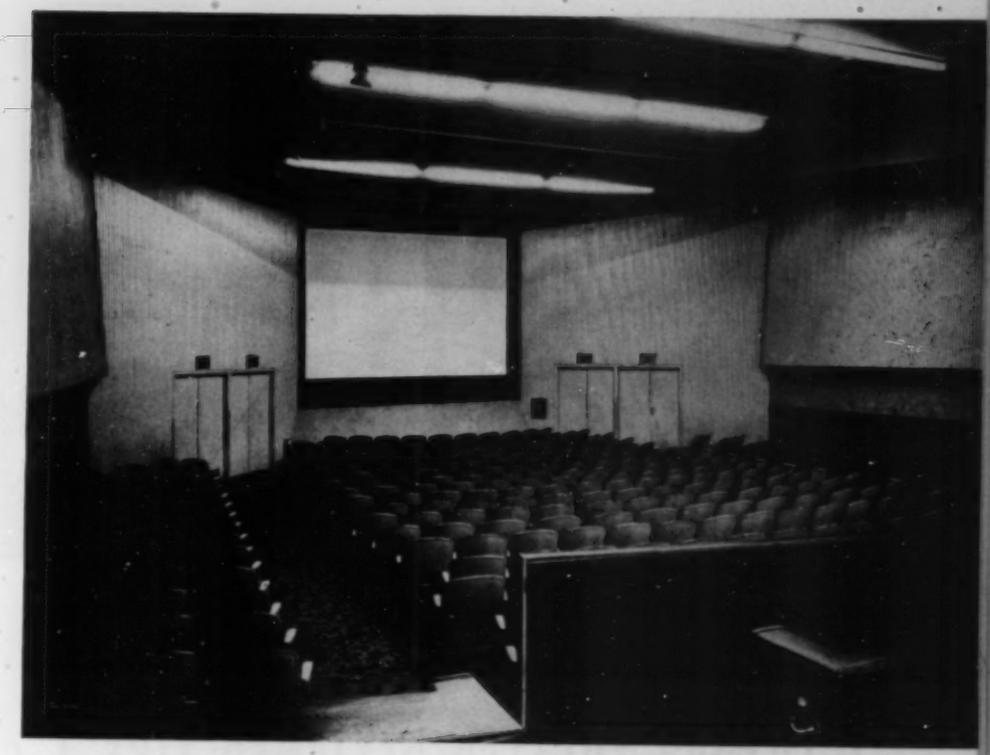
A THEATER DESIGNED WITH LIGHT METERS

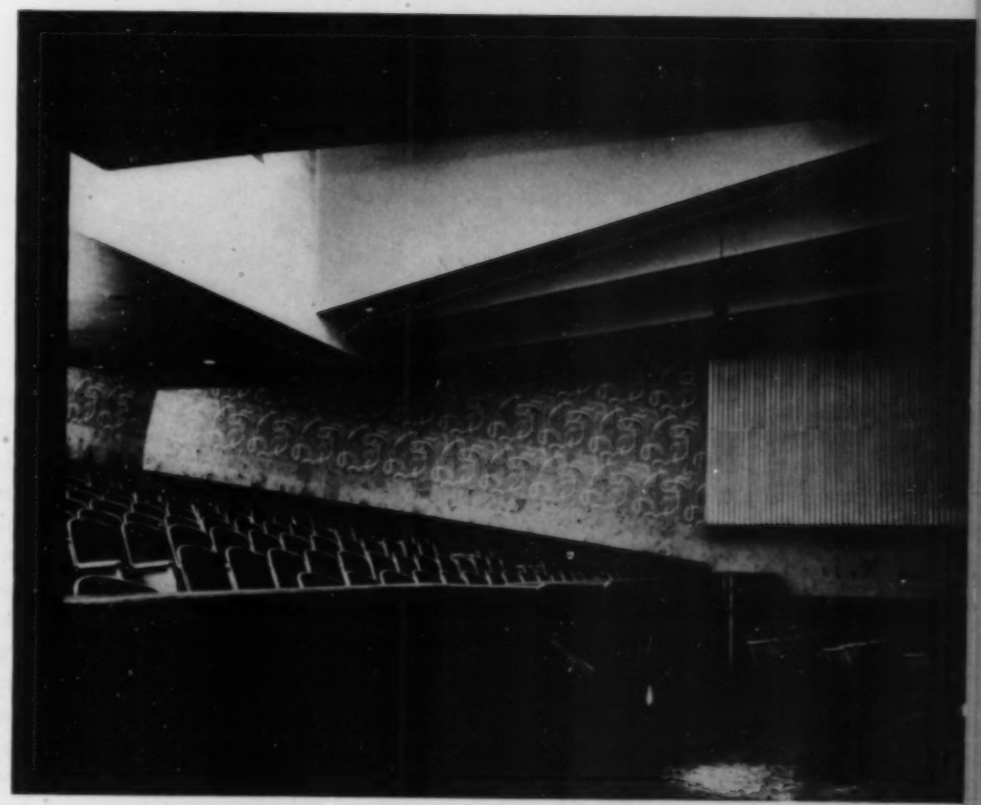
Studio Theater, New York, N. Y. ***Ben Schlanger, Architect***

Gottscho-Schleisner Photos

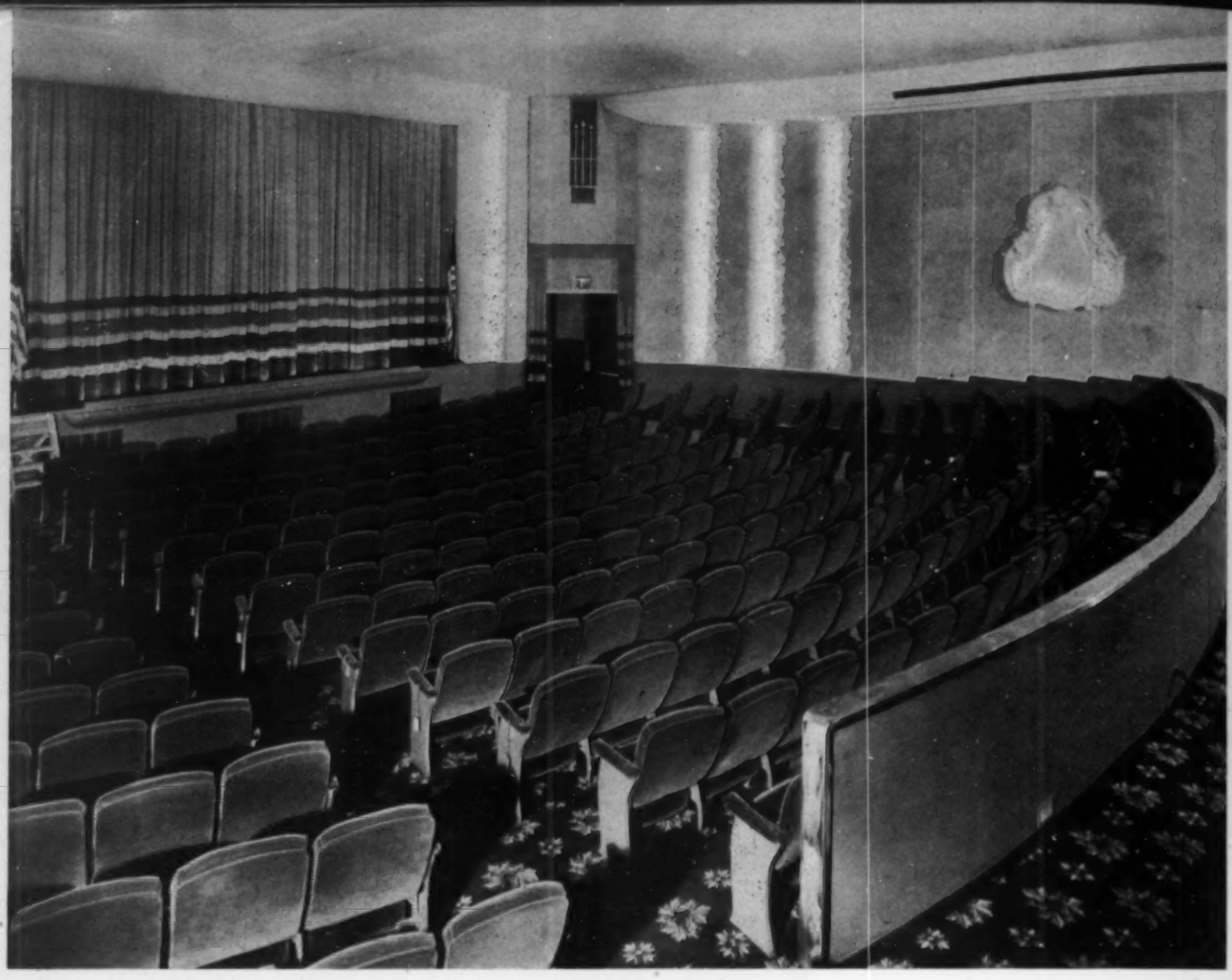
MANHATTAN'S new Studio Theater is an experiment in reflected lighting. Its auditorium walls are left almost entirely undecorated, to avoid competition with the screen image. But though they are not decorated, the walls and ceiling surfaces around the screen are carefully slanted and textured to reflect the brightness of the screen image into the auditorium itself. Corrugations in the walls were designed at the exact angle that would reflect the light emanating from the screen to illuminate the seating area. Secondary lighting to maintain a low overall brightness throughout performances was cut down to a minimum.

One of the pleasing results of this scheme lies in the fact that the relationship between screen brightness and overall auditorium illumination remains constant, even if the scenes projected are of low light intensity. Tests are now being made to determine the success of this highly promising lighting design.





The seating arrangement is not very unusual, with a stadium-type layout in the rear. It is interesting to examine the slight irregularities in the seating pattern, caused by Architect Schlanger's analysis of sightlines from each individual seat. To adjust the seating pattern to the requirements of unobstructed vision, odd-sized seats have been used occasionally together with chairs of standard width



A LUXURY THEATER DESIGNED LIKE A CLUB

Park Avenue Theater, New York City

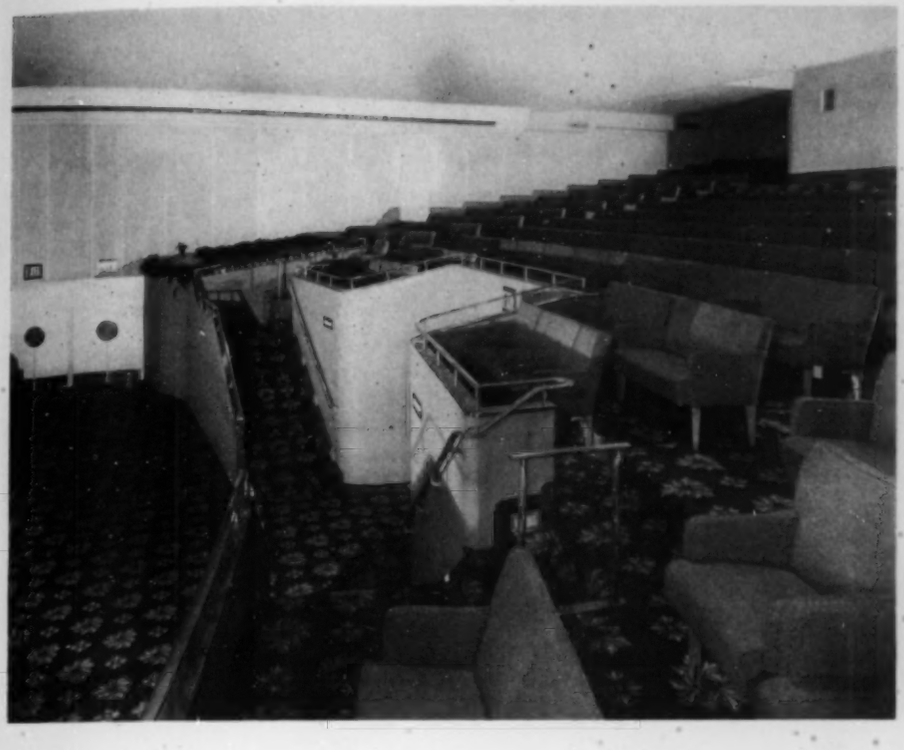
William I. Hohauser, Architect & Engineer

WHEN this luxury theater was first built, it was intended to have the character of a private club, with reserved tickets obtainable by subscription. For practical reasons, this policy of exclusiveness was abandoned early in the game, but the club atmosphere remained.

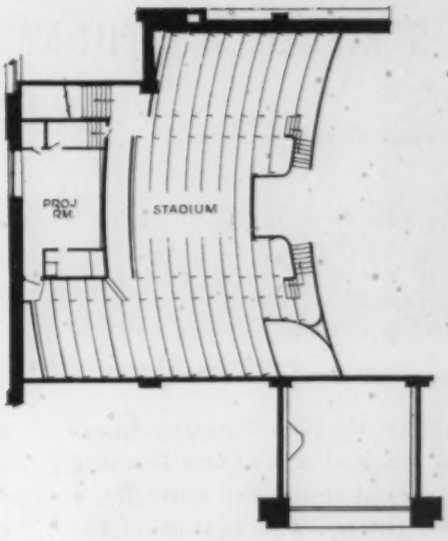
The entrance marquee is extremely simple, and lacks the vulgarity usually associated with movie houses. Since the Park Avenue Theater is a specialty job, with an exhibition policy that concentrates upon exceptional movies, it is not necessary to provide advertising signs that spell out the name of the current show. The customers know that the picture is likely to be good, and display cases at the entrance give additional details. The entrance lobby itself is simple and spacious, and the inside lounges are more lavishly decorated. Nevertheless they are relaxing, quiet and pleasant.

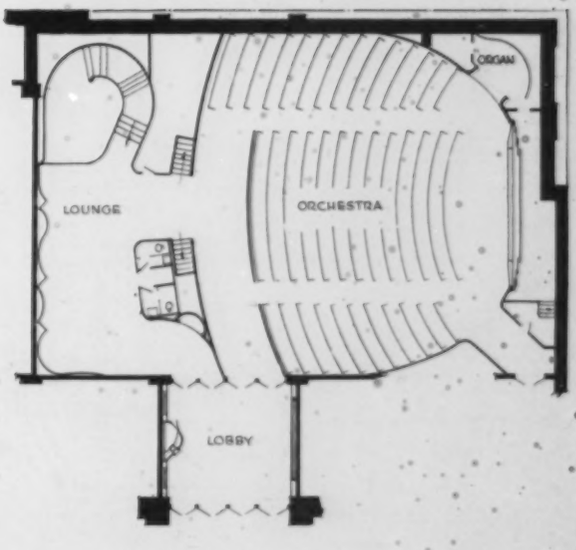
In the basement there is a comfortable lounge where coffee is served and where customers can watch the latest television programs while waiting for the picture to start. Here again the club atmosphere has been successfully maintained.

The auditorium is remarkable in several respects. First, the seating is unusually comfortable, and the rows of seats are spaced far apart. In the mezzanine there are 125 love seats which, according to the architect, accommodate "two people in parlor comfort."



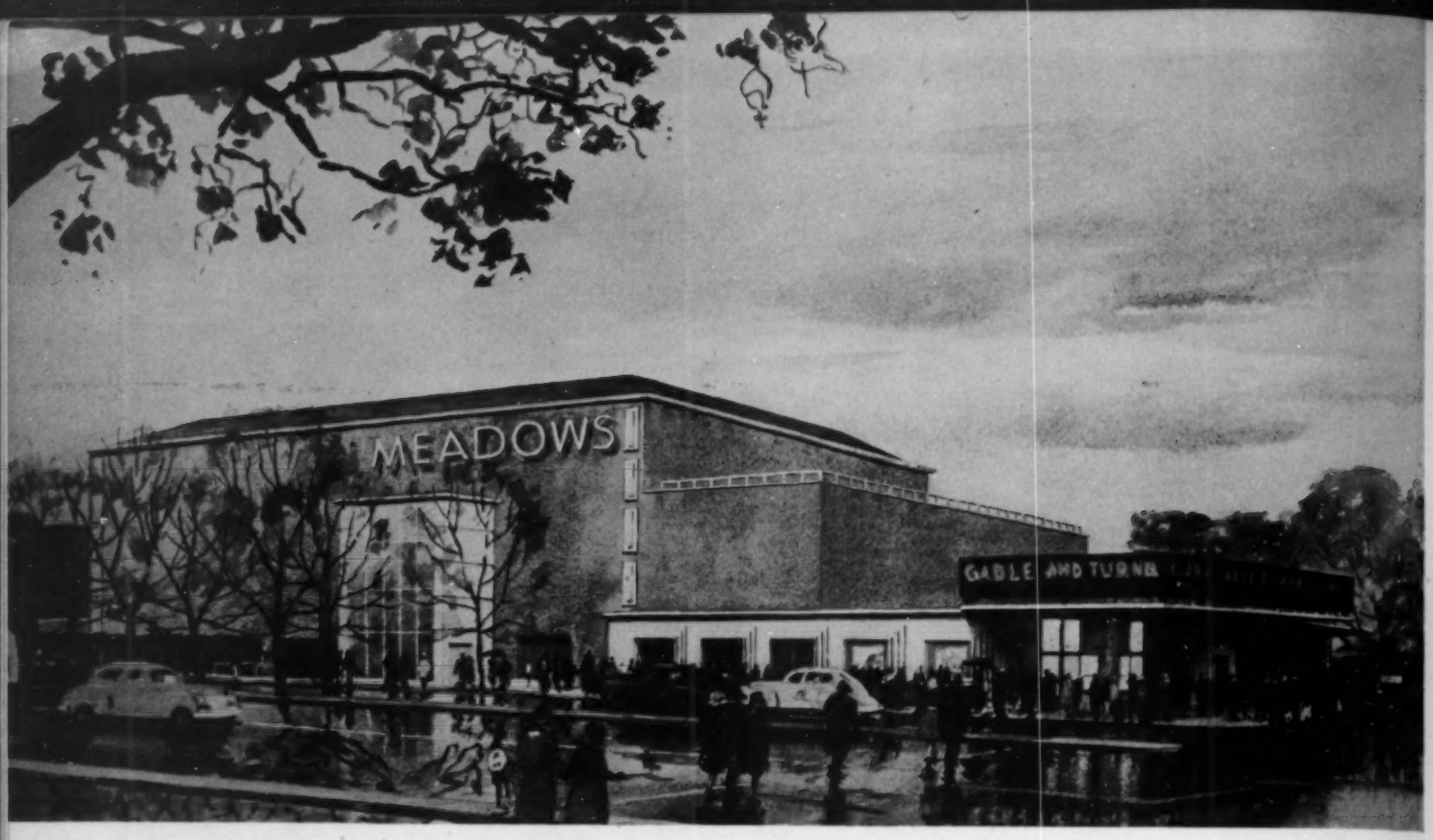
Gary Wagner





The seating plan is carefully worked out, and seats are staggered and placed at an angle to the screen. Hearing aids are provided for those who need them.

The theater is serviced by a 60-ton air conditioning system, supplemented with sterilamps. The lighting is well developed, and seats are easy to find even when the auditorium is darkened for the showing of the film. The shape of the auditorium was controlled by the existing structure and this accounts for the perhaps excessive width in relation to length, involving an excessive sight angle for some seats. The theater demonstrates that the feeling of luxury can be attained without resorting to exuberant ornamentation.



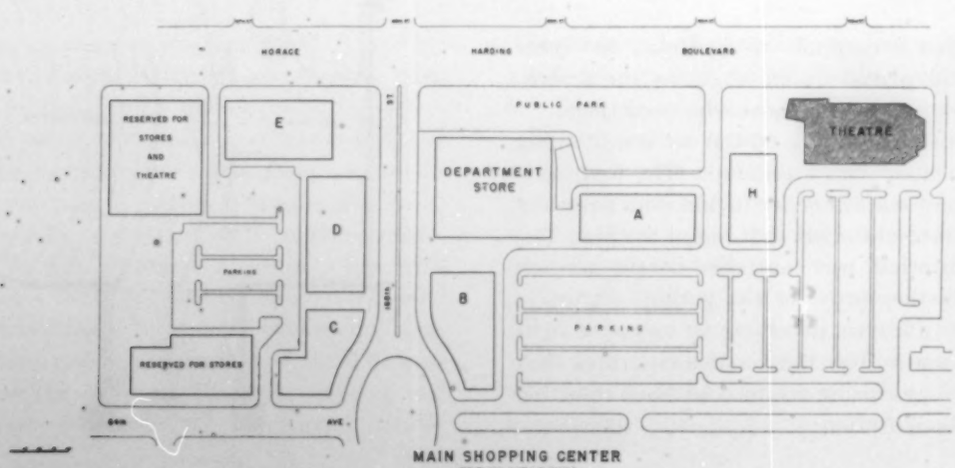
CENTURY'S MEADOWS THEATER, Fresh Meadows, New York

New York Life Insurance Company, Owners

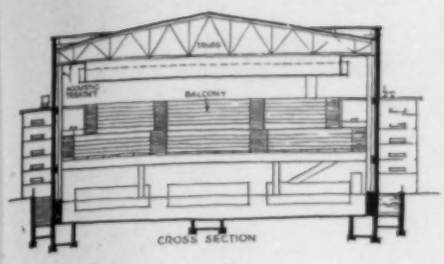
Voorhees, Walker, Foley & Smith, Architects & Engineers

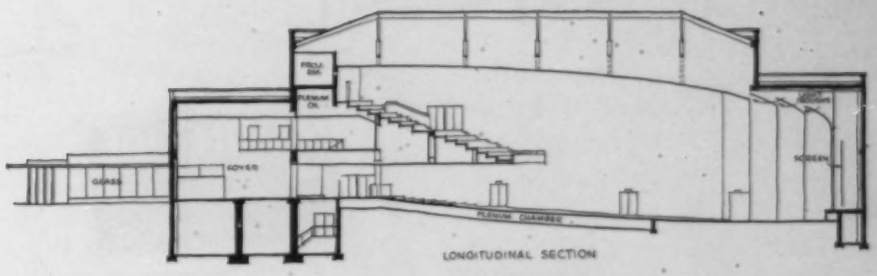
John J. McNamara, Consulting Architect for the Tenant, Century Theaters

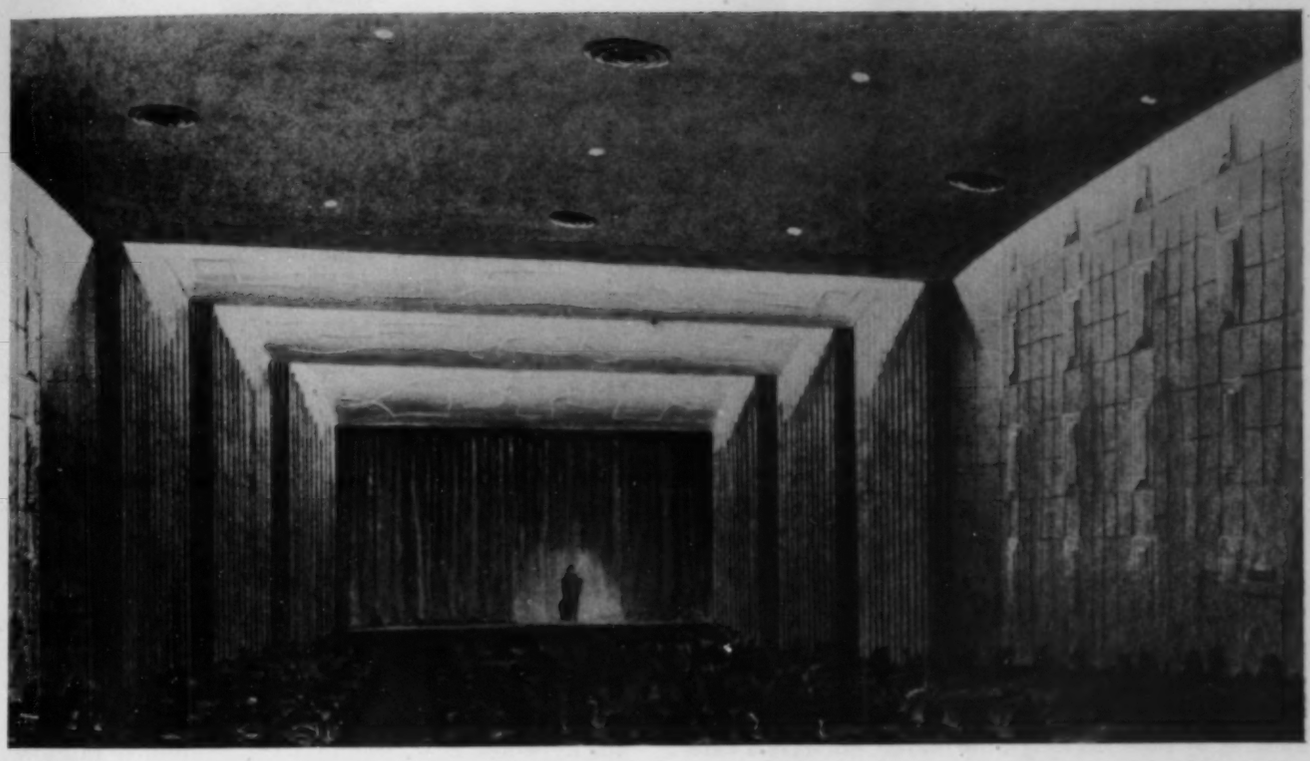
In its planned community, the New York Life Insurance Company has provided a complete shopping center, with various types of stores and, naturally, a large and well-designed theater. The location of the theater in the shopping center was carefully studied to provide maximum convenience for its patrons. Located on a main traffic artery, it also adjoins large parking areas which serve the stores during the day. The free-standing building is well situated for visibility and for approaches without being in a position to cause any congestion. The theater provides 1600 seats on the orchestra floor and 500 seats in the balcony.



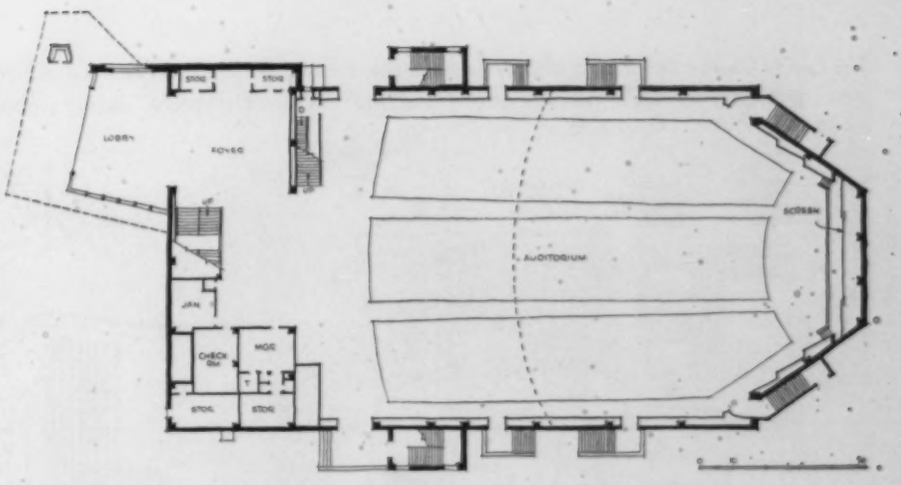
MAIN SHOPPING CENTER
FRESH MEADOWS

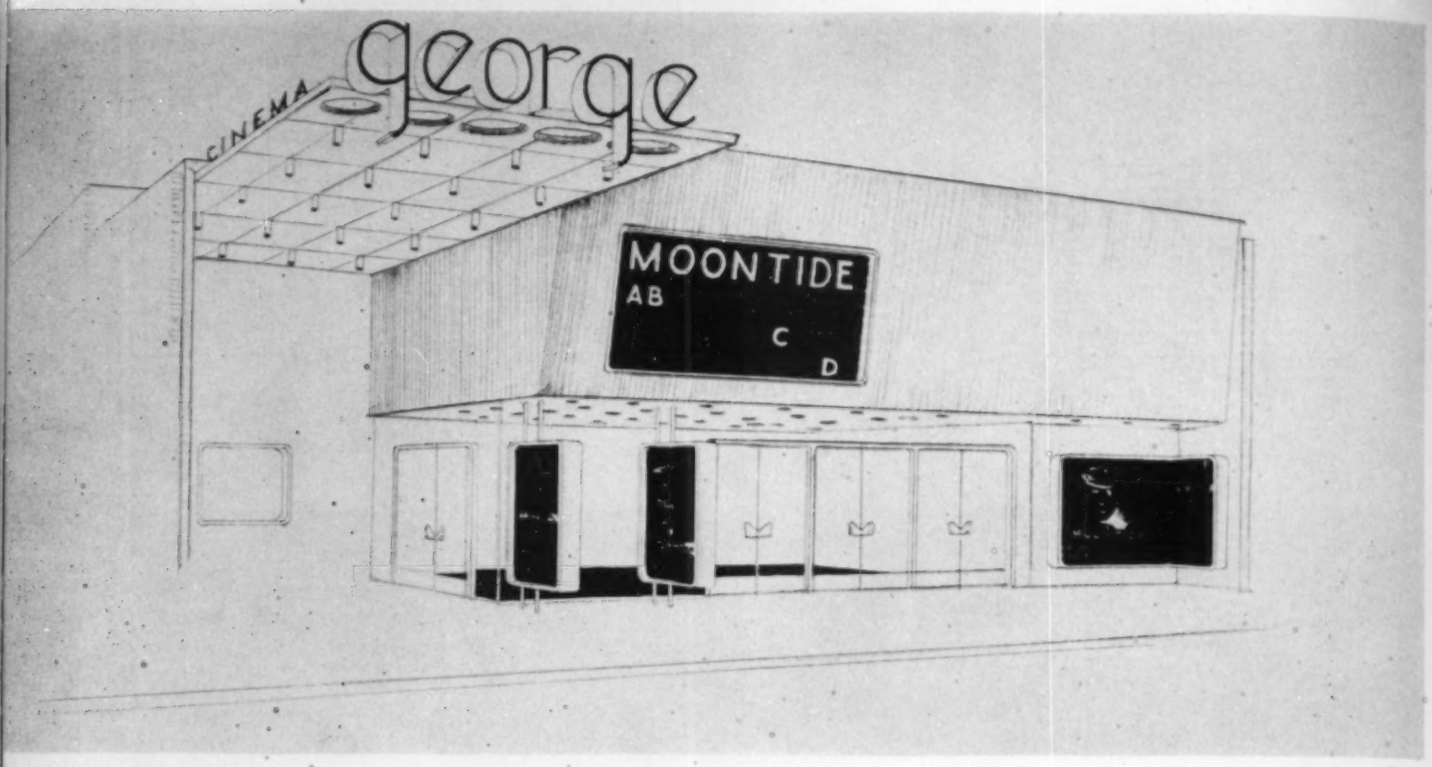






The perspective of the interior of the auditorium shows the interesting lighting scheme which is further explained on the diagrammatic transverse section above. The hung ceiling with flush down lights has wide coves along each side for lighting the side walls. Transition of the ceiling to the proscenium opening is achieved with stepped lighting troughs. Separate circuits for performance and general lighting are provided. Border and footlights are controlled by a dimmer circuit. The shape of the ceiling and the pattern of the side walls are designed for acoustic efficiency and certain areas of the side walls are of acoustic materials





The ticket window wall at left is faced with granite veneer, standing display cases are aluminum framed, canopy is faced with aluminum

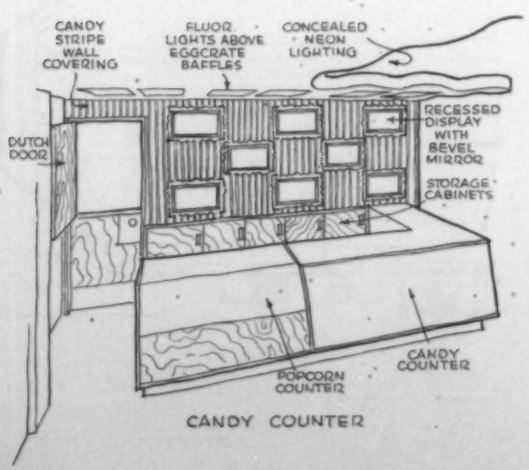
THEATER FOR WAPAKONETA, OHIO

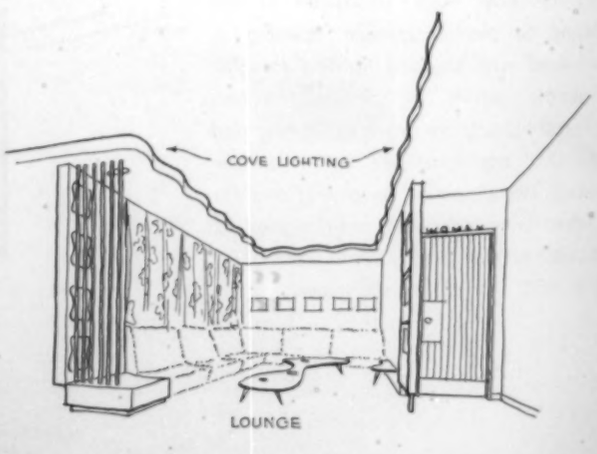
George Theater ***Lyman T. Strong, Architect***

THIS remarkable little theater is projected for a town of 8000 inhabitants near Lima, Ohio. It will have 800 seats, and specialize in the showing of good movies. Judging by these drawings, the movies will have a hard time keeping up with the architect's work.

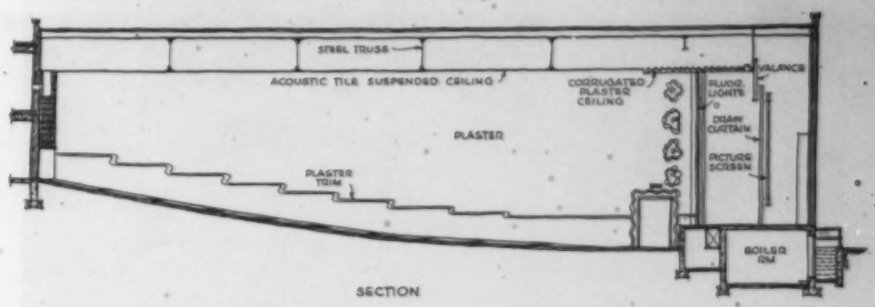
Most striking in the design is the neat and dignified manner in which the façade has been treated. While the front has been set back a little to permit pedestrians to look at the displays without obstructing normal traffic, the aluminum canopy extends 7 ft. over the sidewalk. Apart from the pleasant lighting scheme indicated in the drawings, it is clear that the problem of marquee lettering has been given the most careful attention. The architect undoubtedly realized the effectiveness of a simple display scheme to draw attention in the neon-jungle typical of any American Main Street. Further-

The Candy Counter has framed display cases set into the rear wall, and a bleached oak display and sales unit in front. Sketch of lounge shows provisions for exhibition photographs and small pieces of sculpture. Ceiling pinpoint lighting was designed to illuminate these

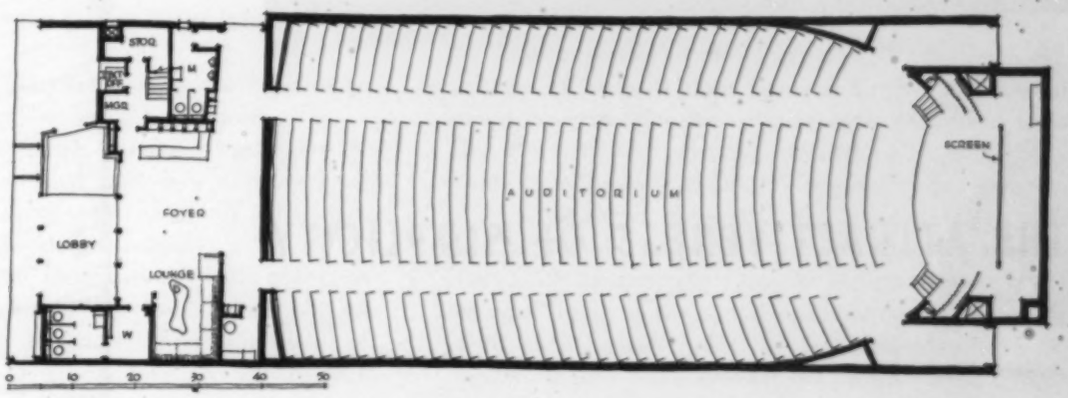




The plan of the entrance portion of the theater reveals a small lobby, entered from the outside through glass doors set in glass panels, and containing a candy sales counter, a small lounge, and the usual services. Detailing throughout is handsome and thoughtful, and recessed lighting provides a friendly atmosphere



The section of the auditorium (above) closely follows the existing grade lines. The curved concrete floor was designed especially for this theater's seating arrangement, and should not be taken as standard for any other design.



more, by setting some of his display cases at right angles to the traffic flow, he saw to it that passers-by would catch at least a glimpse of them. The inviting entrance lobby could be counted upon to do the rest.

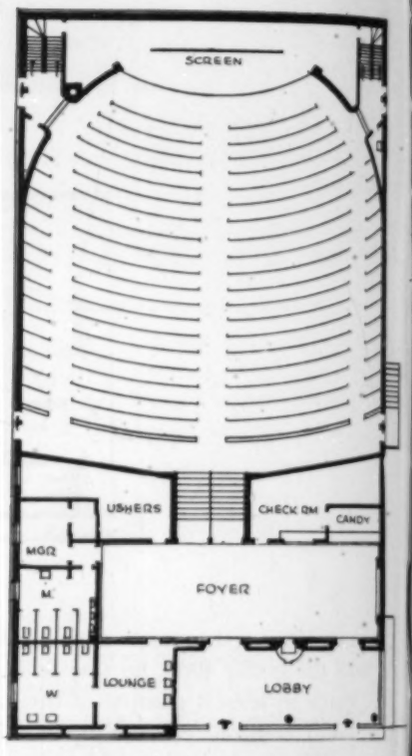
The plan is extremely simple and adequate for so small a theater. In the seating arrangement of the auditorium, careful attention has been given to the sight lines. The auditorium is air conditioned and has radiant heating.

Hoyward Studios Photos

THE ATTRACTIVENESS OF SIMPLICITY

Avenue Theater, Montreal, Quebec

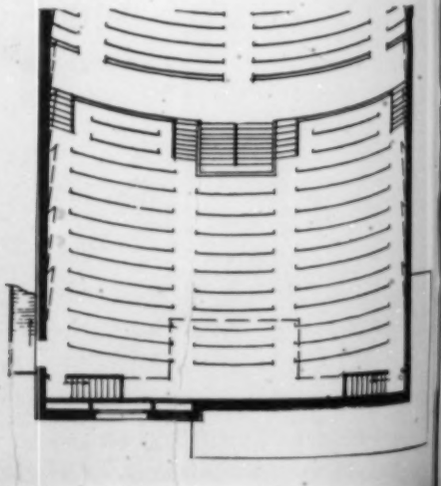
Luke, Little and Mace, Architects



MAIN FLOOR PLAN

THIS unpretentious movie theater is located in a residential district of Montreal. Its simple and dignified design makes no attempt to run counter to the character of its neighborhood, and yet attracts its public.

Especially notable in this concrete frame structure are the effective canopy design, the plainly visible displays in the glass-enclosed lobby, and the straightforward stadium-type plan of the auditorium. The vertical, full-height "window" on the principal façade unfortunately turns out to be elaborately unnecessary. The entrance foyer, with its flagstone floor, has a curved, sound-absorbent ceiling of flock applied to plaster. The auditorium interior is generally clean in design, although the decorative patterns around the screen may prove distracting. General lighting sources on the side walls are shielded from the audience.



STADIUM PLAN

ACOUSTICAL DESIGN OF THE THEATER

By Vern O. Knudsen and Cyril M. Harris†*

In planning for good acoustics the architect will avoid errors in design if he sets up a check list of the necessary and sufficient measures to be taken. These steps, approximately in chronological order, are as follows:

1. The selection of the site in the quietest surroundings consistent with other requirements.
2. A noise survey to determine how much sound-insulation must be incorporated.
3. The arrangement of the rooms within the building.
4. The selection of the proper sound-insulation constructions.
5. The control of the noise within the building, including solid-borne as well as air-borne noise.
6. The design of the shape and size of each room that will insure the most advantageous flow of properly diffused sound to all auditors, and that will enhance the esthetic qualities of speech and music.
7. The selection and distribution of the absorptive and reflective materials and constructions that will provide the optimum conditions for the growth, the decay, and the steady-state distribution of sound in each room.
8. The supervision of the installation of acoustical plaster, plastic absorbents, or other materials whose absorptivity is dependent on the manner of application.
9. The installation of sound-amplification equipment under the supervision of a competent engineer, wherever such equipment is necessary.
10. The inspection of the finished building, including tests to determine whether the required sound-insulation, sound-absorption, and the other acoustical properties have been satisfactorily attained.
11. Maintenance instructions, in writing, to be left with the building manager.

ROOM DESIGN AND ACOUSTICS

The shape of a room is one of the important factors affecting its acoustical properties. Hence the determination of the most desirable shape is a problem that the architect should know how to solve.

Floor plan. The optimum ratio of length to width for a room is not a fixed number, but varies with the size and shape of the seating area; it also depends on whether a sound-amplification system is used. For most rooms, ratios of length to width of between 2:1 and 1.2:1 have been found satisfactory.

Circular and elliptically shaped floor plans nearly always give rise to focusing effects, non-uniform distribution of sound, and echoes. The focusing defect is even more pronounced in elliptical plans. In both elliptical and circular plans, the acoustical conditions can be improved by addition of convex diffusing surfaces.

In order to bring a large audience as close as possible to the stage of an auditorium, it is advantageous to design a floor plan with diverging side walls. Reflections from these walls can aid in the establishment of a higher sound level at the rear of the auditorium, but these reflections must be carefully controlled. Path-length differences of 65 ft. or more between direct and reflected sound give rise to echoes. Path-length differences from about 50 to 65 ft. produce a blurring quality which may result in a lack of "intimacy," especially for auditors in the front seating area. Intimacy is a qualitative term used to describe the extent to which sound appears to come from the screen in a motion picture theater. If the included angle of the sound received by an auditor is small, then he will judge the auditorium to have intimacy. In this respect, reflections from the side walls are more significant than those from the ceiling, for one's ability to localize sounds in the horizontal direction is somewhat greater than it is in the vertical direction.

Elevation of Seats. Since an audience constitutes a highly absorptive surface, sound waves which graze it are greatly attenuated. Hence, it is good design in an auditorium, from a standpoint of hearing as well as seeing, to elevate the seats in order to provide a free flow of direct sound from the source to the listeners. A good line of sight will do this. It is advantageous to stagger the seats as well. The first few rows can be level since they will have a good line for both sight and sound. The higher the source is elevated, the farther back the level area can be extended.

Ceilings. The ceiling and walls should provide favorable reflections of sound, especially for the seats far removed from the stage. In some instances, the ceiling should also aid in the diffusion of sound. However, if adequate means of diffusion are furnished by the floor and wall surfaces, and no additional diffusion is needed by the ceiling, it may be utilized to the utmost for the advantageous reflection of sound. Lecture rooms and chamber music rooms are types of rooms in which a low, smooth, highly-reflective ceiling may be used to good advantage.

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There is no simple (or even complicated) formula for calculating the optimum ceiling height of a room. Consideration must be given to the optimum volume. In general, the ceiling height of a room to be used for speech and music should be about one-third to two-thirds of the width of the room — the lower ratio for very large rooms, and the higher ratio for small rooms. If the ceiling of an auditorium is too high, not only will the volume-per-seat be excessive, but long-delayed reflections from this surface can be the source of echoes.

Ceiling splays in the front of a room, or appropriately tilted portions of the ceiling, can be devised so as to reinforce the sound reaching the rear parts of an auditorium. They serve the same purpose as do the front splays of the side walls. The law of reflection (angle of reflection equals angle of incidence) can be used to determine the most propitious angle of inclination. Similarly, a splay between the ceiling and the rear wall can be designed to reinforce the sound in the rear of the room, and at the same time to prevent echoes from the rear wall. This is illustrated in Fig. 1.

Concave surfaces such as domes, cylindrical arches, barreled ceilings, etc., should be avoided wherever possible, see Fig. 2. If they are required by the architectural style, as in a Jewish Synagogue, then the radius of curvature should be either at least two times the ceiling height, or less than one-half the ceiling height. If coves, bays, or other small concave surfaces are employed, their radii of curvature should be quite small compared to the ceiling height. The most serious defects (sound foci or echoes) occur when the radius of curvature of a ceiling surface is about equal to the ceiling height.

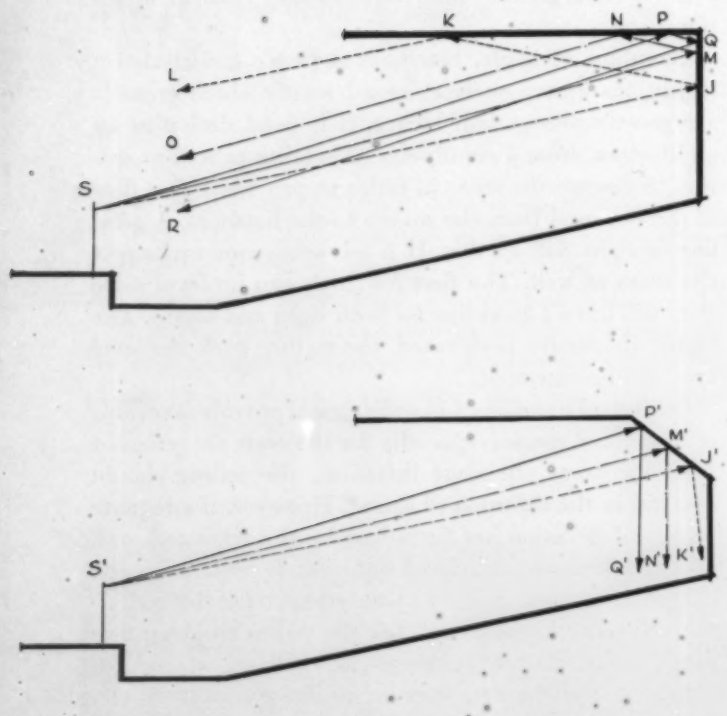


Fig. 1. *Reflection of sound from rear surfaces of an auditorium, showing how a suitable ceiling splay can be used to prevent echoes from reaching the front seating area, and at the same time to reinforce sound for the last few rows of seats*

In order to avoid flutter echoes, a smooth ceiling should not be strictly parallel to the floor. If the floor and ceiling are both smooth, level and highly reflective, the flutter between the floor and ceiling will be very prominent.

Side Walls. The side walls should reinforce the sound that reaches the rear parts of a large room. While the location of the walls is determined largely by the general contour of the floor plans, the angle that any portion of the surface of these walls makes with the center-line need not be, if splays are employed. The law of reflection can be used to determine the proper angle for the wall surfaces so that they will guide sound to those seats where the sound level is not adequate. The side walls should be designed so that the sounds they reflect to the audience will not be too long delayed. Some parts of the side walls may be suspected of causing echoes or unduly delayed reflections; this may happen in very large auditoriums. In such instances the suspected surfaces should not be smooth and reflective. Instead they should either be made "acoustically rough" to diffuse the sound, or they should be covered with highly absorptive material.

Flutter echoes frequently occur between the side walls. They can be avoided by a number of means: by diverging, non-parallel, or tilted walls; by splayed, or V'd, walls. Splays not only serve to prevent flutter, but they can contribute both to desirably directed reflections and to the diffusion of sound within the room. As little as $\frac{5}{8}$-in. splay to the running foot will prevent flutter.

Rear Wall. In the design of all rooms, large concave rear walls should be avoided. Unfortunately, they are of common occurence because it seems so simple and economical to most architects to have the rear wall following the curvature of the last row of seats. Walls having this shape are responsible for troublesome echoes and delayed reflections in many theaters and auditoriums. This is illustrated in the upper part of Fig. 1. Often these reflections from concave rear walls are concentrated in regions near the microphones of the sound-amplification system, causing feedback trouble and howling. These detrimental reflections can be converted into beneficial ones by introducing a ceiling splay between the ceiling and the rear wall, as shown in the lower sectional drawing of Fig. 1. Concave surfaces in certain situations can be made as effective as splays, and they are sometimes better adapted than splays to the general appearance of the room. However, unless properly designed, they can lead to focusing effects. In some designs, splays between the ceiling and side walls are useful in preventing long-delayed reflections and in directing advantageous reflections to the audiences.

If reflections from either a vertical or tilted wall are capable of producing echoes, the offending surface should be treated with absorptive material. There will still be some reflection from this surface but the sound

level is thus reduced so greatly that its detrimental effects are negligible.

Balcony Recess. Good design of a balcony recess usually requires a shallow depth and a high opening. For an auditorium or legitimate theater, the depth should not exceed twice the height of the opening. This permits sound to flow readily into the space under the balcony. Good design also requires that the reverberation time in the balcony recess approximate that of the main part of the auditorium.

By applying the above rules, it is possible to design the recess so that the sound level in this space is about the same as it is in other equally distant parts of the auditorium. However, if the opening is low and the recess relatively deep, the sound level will be considerably lower in this area, especially at the rear of the recess. In large auditoriums and theaters it is advisable to "break up" the rear wall in order to provide proper diffusion of sound throughout the balcony recess. A large unbroken concave rear wall always should be avoided, since it invariably gives rise to a non-uniform distribution of sound. Trouble of this kind also may arise from large vertical surfaces of glass in front of the standee rail. If the chairs are highly absorptive, as they should be, it usually will not be necessary to add any absorptive material to the balcony recess other than the absorptive material on the rear wall. If the chairs are not absorptive, it may be necessary to add some absorptive material to the soffit or side walls of the recess in order to provide the optimum reverberation in this space. When this is done it is desirable to distribute this material in panels, strips, or patches.

The balcony rail (front) should not be overlooked in working out the acoustical design of an auditorium. Since it is frequently a large concave surface having a width that is large compared with the shorter wavelengths of speech and music, the balcony front can give rise to an echo or "slap-back." By tilting this surface downward and making it convex it is sometimes possible to utilize the resulting reflections to increase the sound level at the rear of the auditorium. Otherwise, the front should be highly absorptive or have a contour such that reflections from it will be diffused and not concentrated in small areas.

Control of Reverberation. Sound which originates in, or enters, an enclosed space is repeatedly reflected by its boundaries. At each reflection, a fraction of the acoustical energy is absorbed. Nevertheless, the sound may persist for many seconds before it dies away to inaudibility. The greater the volume of the room, and the less absorption it contains, the longer will be the reverberation.

A limited amount of reverberation is desirable in most rooms. However, excessive reverberation is one of the most damaging and annoying defects that can be inflicted upon a theater.

The reverberation characteristics of a room can be controlled by the amount and placement of absorptive material within it. The total amount of absorption in a properly designed room determines the rate at which sound will decay in it. Proper distribution of the absorption aids in controlling the diffusion of sound and also the nature of the time fluctuations of the sound during its decay.

The first step in planning the acoustical treatment of a room is to determine the optimum reverberation time (see TIME-SAVER STANDARDS, page 157) and to find the total number of square-foot-units (sabins) of absorption required to give this time. A large part of this absorption will be furnished by agents other than acoustical materials, for example, by the chairs, rugs, audience, walls, ceiling, etc. It is customary to assume that the size of the audience in an auditorium will be equal to two-thirds of the seating capacity. Then the amount of absorption that must be added is the difference between the total required units and the number of units furnished by the above-named agents.

The questions remain: Where should the material be placed, and what materials should be used?

As a general rule, the surfaces surrounding the stage should reinforce, by useful reflections, the "voices" of the performers, though on the other hand, the rear wall must be designed so that long-delayed reflections from it are prevented from reaching the audience. This requirement usually necessitates the use of a highly absorptive rear wall; the portion of the wall above the wainscot (the wainscot should extend not more than about one foot above the heads of the audience) should have an

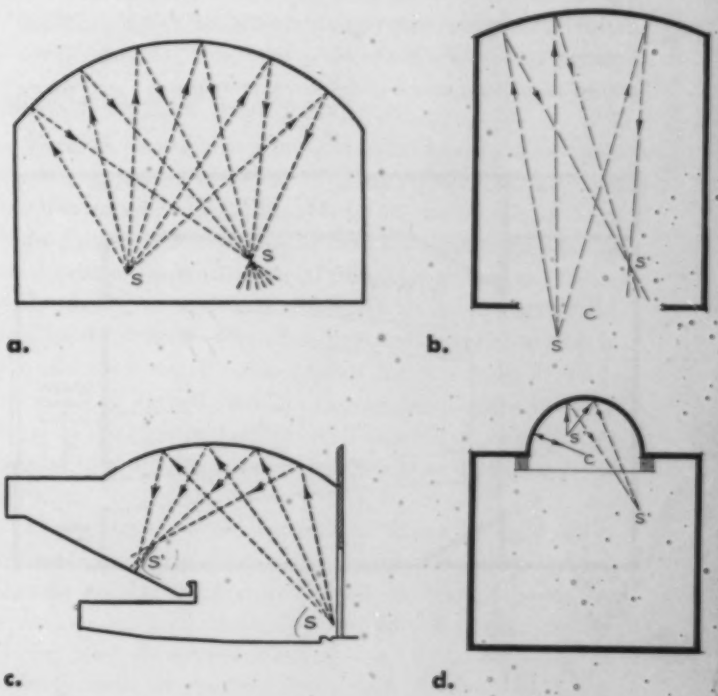


Fig. 2. (a) Reflection of sound from a barreled ceiling with a radius equal to the height of the room. (b) Reflection of sound from a concave rear wall. (c) Reflection of sound from a domed ceiling. (d) Reflection from a cylindrical wall behind speaker

average absorption coefficient in excess of 0.75. In auditoriums where the acoustical design indicates the desirability of tilting forward the rear wall so that reflections from this surface may be beneficially utilized, very much less absorptive material is needed and it should be applied in patches or panels. After allowances have been made for the rear wall treatment, the remainder of the required additional absorption should be distributed on the side wall — preferably in patches, strips, or panels having dimension of the order of 3 to 5 ft. The application of the absorptive material in the form of patches not only promotes diffusion but it helps to suppress flutter echoes.

It is important to choose materials that will provide the optimum reverberation time throughout the entire relevant range of frequencies, *not* at just one frequency.

THE LITTLE THEATER

In the little theater, the architect has an opportunity to design a structure that will embody the highest attainable standards of acoustics. If the seating capacity is limited to 300, the volume of the auditorium should not exceed 50,000 cu. ft. All seats are located on one floor, the rear portion of which should have a steep slope so that auditors will have good sight-lines and good sound-lines in all parts of the auditorium. The ceiling should not be more than 20 ft. high and should be left smooth. A highly reflective finish material will serve to direct the sound toward the rear seats. Diverging walls are desirable but not as necessary as in larger theaters. The lower 8 or 10 ft. of the side walls should be of reflective material. The front portions of these walls should not be pierced with boxes.

The chairs should be upholstered with absorptive cloth, such as mohair, over deep porous padding. The absorption of each chair should be three to four square-foot-units (sabins) at all frequencies about 512 cycles, and two to three sabins at frequencies of 128 and 256 cycles. The reverberation time of the theater will then be nearly independent of the size of the audience. Even during rehearsals the reverberation will be close to the optimum value.

The benefits associated with the small volume (less than 50,000 cubic ft. for the audience space) should not be nullified by making the stage recess so large that the sound is dissipated before it reaches the seating area. The volume of the stage should be reduced to a minimum consistent with other requirements. Stage settings with rear, side, and overhead reflective surfaces, should be designed so as to confine the sound to a small volume and reflect it to the audience. The use of plywood flats, or heavily-painted canvas flats is advantageous for the ceiling as well as the side and rear walls of the stage set. Designers of stage sets should be instructed not to ignore these pertinent requirements for good acoustics, which are especially necessary when the stage is large.

The stage floor should be elevated as high as possible, consistent with good sight-lines from all seats; this usually will allow an elevation of about 42 in. above the front level portion of the main floor. Orchestra pits should be avoided whenever possible; if indispensable, it is advisable that they be covered with a sound-reflective apron (plywood or heavily painted canvas) when not in use.

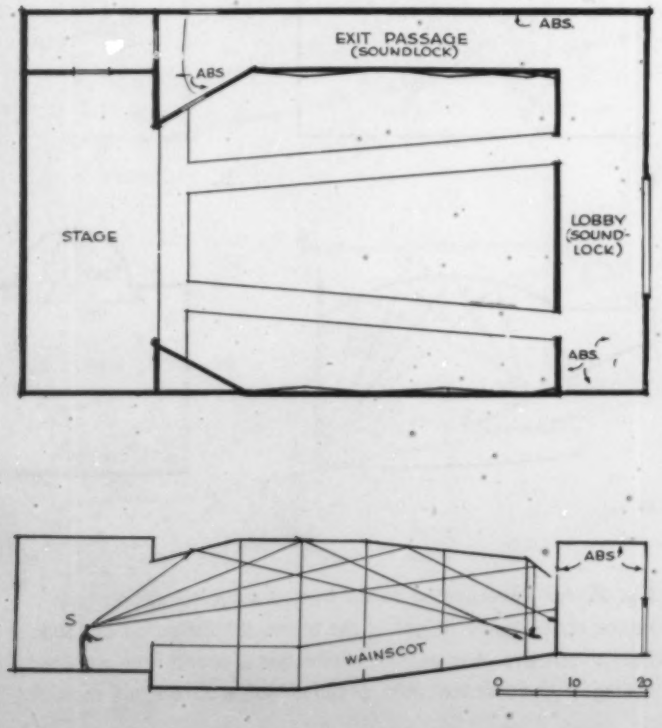
The optimum times of reverberation for the auditorium in a little theater having a volume of about 40,000 cu. ft. (the volume of stage is not included) are approximately 1.5 seconds at 128 cycles, and 1.0 second at 512 to 4096 cycles. These values are a compromise between those given by the curves for "speech" and "average music" on page 159.

The exclusion of both outside and indoor noise should receive study whether the site is quiet or noisy. The average level of noise in the empty auditorium should not exceed 35 db, and if the highest standards of acoustics are required, this level should be reduced to 30 db.

A sketch of a plan and section for a little theater, based on a study of the requirements for ideal acoustics, is shown in Fig. 3. The auditorium is isolated by two walls on the sides that are adjacent to streets. These walls, in combination with the promenade and lobby which they enclose (and which, with heavily carpeted floors, act as sound locks), provide an average transmission-loss of at least 60 db.

The splayed walls and ceiling of the proscenium, the flat ceiling of the auditorium, and the lower portion of the side walls are designed to reflect useful sound upon the audience, and accordingly are finished with reflective materials (suspended plaster ceiling, furred-out plaster

Fig. 3. *Plan and section of a little theater of good acoustics design. Auditorium is isolated from street noises by lobby and exit passage, both lined with absorptive treatment. Ceiling splays are angled to reinforce sound at the rear with reflected sound waves*



walls, and plywood waiscot applied to randomly spaced wood strips). The aisles are covered with cork carpet in order to reduce the noise of footfalls, and the floor under the seats is covered with linoleum to reduce the noise of scuffing feet. No special absorptive materials were needed in this theater to provide the optimum reverberation times — the total absorption furnished by the audience, chairs, and the materials for the walls, floors, and ceiling did not differ more than 5 per cent from total required absorption. The desirable outcome followed from the choice of a small volume per seat for the theater (148 cu. ft.) and the highly absorptive upholstered chairs.

THE LEGITIMATE THEATER

In this section, consideration will be given to legitimate theaters that are larger than the one described in the preceding section. Although the same general principles of design apply here with equal relevance, there is one important point of difference. In legitimate theaters, because of their larger size, speech is at a lower sound level than it is in little theaters. In fact, it frequently is not loud enough for good audition.

Therefore it is of the utmost importance to design the shape of the auditorium so that it will provide the audience with the greatest possible amount of direct and of beneficially-reflected sound. The divergence of the side walls, the slope of the overhead proscenium splay, and the slope of the main ceiling of the auditorium should be carefully designed to reinforce the sound propagated to the audience, giving some preferential reflection of sound for the rear seats under and in the balcony.

It is good acoustical design to keep the balcony overhang (depth) less than twice the height of the balcony opening, and to keep the balcony soffit reflective and inclined downward toward the rear wall. Heavily upholstered chairs, carpets on the aisles, and such absorptive treatment of the rear wall as is required to prevent objectionable reflections, ordinarily will provide satisfactory reverberation characteristics in the balcony recess. When the ratio of depth to opening-height does not exceed two, this space can be regarded as an integral part of the auditorium, and it then is not necessary to make separate calculations of reverberation in the two spaces — the main part of the auditorium and the balcony recess. In routine calculations of reverberation time, it is customary to regard these two spaces as one single volume and the stage recess as another. It is important that the stage have approximately the same reverberation characteristic as the auditorium. If a theater is to be used for musical as well as dramatic productions, the reverberation characteristic should be based upon the requirements for both speech and music, and the absorptive materials should be carefully located so as to favor a uniform average rate of decay in all parts of the theater.

Fig. 4 shows an acoustical study of a longitudinal section of a theater in which the ceiling surfaces have been designed to reinforce sound by reflection. The overhang of the balcony is short, and the opening under the balcony is high, so that adequate sound will reach the rear seats under the soffit. These seats, which are usually the poorest ones in most theaters, are further benefited in this design by the reflections of sound from both the splayed walls and ceiling of the proscenium. The main part of the ceiling has a gently rising slope in order to provide the most favorable reflection of sound. Heavily upholstered chairs are used throughout, and the aisles are carpeted over a ½ in. carpet pad. Most of the absorption required to provide the optimum reverberation is applied to the rear wall, under and above the balcony, to prevent echoes and interfering reflections from these surfaces. A 2-in. or 3-in. mineral wool blanket covered with perforated plywood, or similar facing, is suitable here. The highly absorptive material should not extend below the height of the heads of the audience. Below this level the rear wall is paneled wainscot, which together with the similar side-wall wainscot, provides much of the required low-frequency absorption. Calculations similar to those described on page 157 should be made in order to determine the kind and amount of additional absorptive material, if any, that is required to give the optimum reverberation characteristic. The directions and procedures outlined in the preceding section for sound insulation and for other acoustical aspects of the little theater also apply to the larger legitimate theaters.

The size of the auditorium should not exceed 100,000 cu. ft. without the use of a sound-amplification system. This recommended upper limit is not a critical value that must be precisely adhered to, but to exceed this volume without the assistance of sound amplification is a risky venture.

MOTION PICTURE THEATERS

Because sound is reproduced in motion picture theaters by means of electro-acoustical equipment that can furnish adequate sound levels in all parts of even very large theaters, the acoustical design of the cinema is not so dependent upon beneficial reflections from the walls, proscenium, splays, and ceiling as is the design of the legitimate theater. The average sound level of speech in the cinema is usually about 65 db for dialogue, which is 10 to 15 db higher than the average unamplified speech level in the legitimate theater. The acoustical power required to maintain this level depends on the size of the theater.

The general considerations of shape already mentioned apply to motion picture theaters. Furthermore, certain admonitions are especially pertinent here. For example, concave rear walls, parallel side walls, parallel ceiling and floor, and surfaces that give long-delayed reflections in the seating area should be avoided. Long, narrow theaters often have very poor acoustics: they are likely to require so much acoustical power from the sound system, in order to give adequate sound level in the rear seats, that the loudness will be excessive in the front and central seats.

Lengths greater than about 150 ft. should be avoided

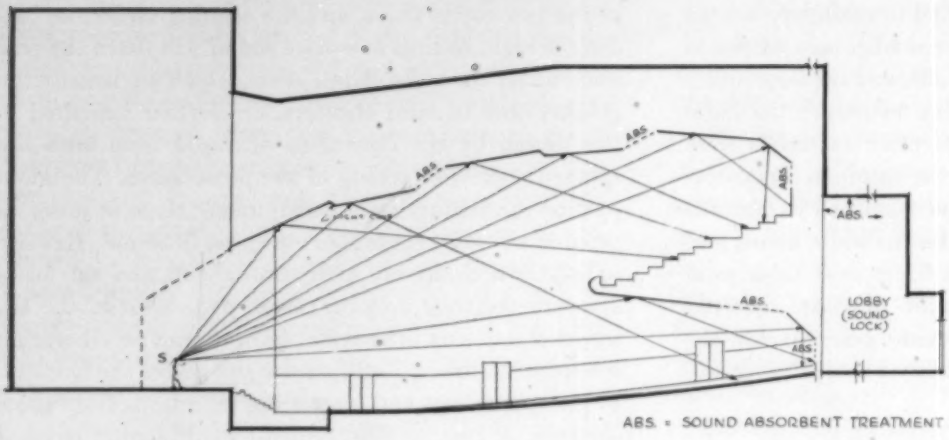


Fig. 4. *Section of a legitimate theater; ceiling surfaces designed to reinforce sound by reflection. Balcony overhang is short, opening under it is high. Absorptive treatment at rear prevents echoes from reaching stage*

in order to avoid a noticeable delay in the arrival of the sound to persons in the rear of the theater. It requires about one-seventh second for sound to travel 150 ft. The lack of synchronism between sight and sound becomes quite annoying when the difference exceeds about one-seventh second. Since the length of the theater may be as great as double the width, it is necessary to design the side walls, floor and ceiling so as to minimize the attenuation of the sound that is transmitted toward the rear seats. Sound which is propagated over an absorptive surface, such as an audience or an acoustically treated ceiling, is greatly attenuated. Hence the floor should rise steeply toward the rear, the loudspeakers and screen should be well elevated, and the ceiling and side walls should neither be highly absorptive, nor obstruct unduly the flow of sound from front to rear. Splays, and other functional deviations in the wall and ceiling contours can be used to give the proper diffusion without hindering the efficient transmission of sound to the rear of the auditorium.

The Motion Picture Research Council recommends, for proper viewing and listening conditions, that the first row of seats be at least 20 ft. from the screen — for screen widths not greater than 16 ft. For wider screens, the first row of seats should be back an additional 15 in. for each foot of screen width over 16 ft.

If there is a balcony, its depth should not be more than three times the height of the balcony opening. A relatively deeper overhang can be tolerated here than it can for a legitimate theater since the average speech levels in a cinema are somewhat higher. The balcony soffit should slope downward toward the rear, and should not be absorptive. The optimum reverberation times for motion picture theaters are given on page 159.

Absorptive material should be applied to the rear wall to eliminate "slap back." Additional absorptive material may be applied to the side walls.

Treatment of the walls behind the screen with highly absorptive material prevents sound which is radiated from the back of the loudspeakers from being reflected to the audience. It also suppresses acoustical resonances that occur on some stages. Mineral-wool blankets have been used in many theaters to treat this area. The absorption characteristics of an acoustical material can be enhanced, especially at low frequencies, by furring it out from the wall. If a blanket consisting of glass wool is used, it should be at least 2 or 3 in. thick and have a density of about 4 lb. per cu. ft. The floor between the screen and the first row of seats also should be highly absorptive, in order to prevent sound from reaching the audience in the front seats by reflection from this area. Such reflections contribute to the loss of "intimacy" — that is, the loss of feeling that the sound is actually coming from the screen. They may be suppressed by covering the stage floor with heavy carpets over 1 in. pads.

In many respects the acoustical problems of motion picture and legitimate theaters are similar. Both should be properly insulated against noise, but in general a slightly greater noise level can be tolerated in motion picture theaters than in legitimate theaters because of the higher speech level. The average "film (background) noise" level is about 35 db, while the average audience noise level in a cinema is about 40 to 45 db.

Since the projection booth is a potential source of noise, all available interior surfaces should be heavily treated with fireproof acoustical material, as a 2 to 3 in. mineral-wool blanket covered with perforated Transite. Double panels of glass of different thicknesses should be employed in the portholes. The windows should fit tightly in their frames so that there are no threshold cracks. It also is helpful to cover with absorptive material the peripheral surfaces separating the double windows. The wall between the projection room and the auditorium should have a transmission loss of not less than 35 db at 128 cycles, and not less than 45 db at 512 to 2048 cycles.

The acoustical designing of theaters can and should be based on the well established science of architectural acoustics. The principles and procedures outlined in this article are derived from that science. If they are carefully followed in the designing and constructing of a theater, there need be no anxiety about the acoustical outcome of that theater — the acoustics will be good.

LIGHTING MOVIE THEATER INTERIORS

H. L. Logan

Manager, Dept. of Applied Research, Holophane Co., Inc., New York City

Lighting designs for motion picture theaters apparently fail to furnish an optimum visual environment simply because the science of seeing has not been applied. The brightness of theater interiors needs to be related to that of the screen; so the author establishes a theoretical basis for what brightness values should be and then proposes a practical arrangement for attaining them. As yet, the author's suggestions have not been applied as a whole to a specific theater. The recent organization of an Illuminating Engineering Society committee to study motion picture theater lighting adds emphasis to the importance of the problem outlined in the following article, which is based on a paper presented by the author at a recent meeting of the Society of Motion Picture Engineers.

Architects and engineers concerned with the design of motion picture theaters generally agree that the continuous lighting of the present-day theater is inadequate — in fact, they go so far as to say that the properly lighted movie theater doesn't exist.

The trend of thought is, first of all, that there isn't sufficient, properly controlled light from the surround to permit best reception of screen images (ability of the eye to resolve detail and to distinguish contrasts increases as the brightness of the surround approaches that of the object viewed); and also that lighting of the interior is insufficient for safe and convenient movement of patrons in and out of seats. It is also believed that more light is needed to provide a comfortable atmosphere and to create a life-like illusion within the theater.

Criterion for Lighting

Conventional brightness rules do not seem to apply to the lighting of motion picture theaters, since the rules are either for critical seeing tasks, or are otherwise irrelevant; so an altogether different approach is necessary. The rational lighting analysis that follows is based on the premise that the eye adapts itself to the average screen brightness with film running. Thus if the average screen brightness is known, the illumination needed for the interior can be related to that value. To obtain average screen brightness values, typical films were run and the brightnesses were measured with a specially developed instrument.

If the lowest mean brightness that is to be met, namely that of black-and-white newsreels, is used as the reference value, the brightness of the screen with film running can be taken as 1 foot-lambert. One-tenth of that value can be allowed, according to available research data,* for brightness of the walls, ceiling and floor of the theater, as long as the

* The Scientific Basis of Illuminating Engineering, Parry Moon McGraw-Hill Book Co., Inc., New York, 1936, p. 441.

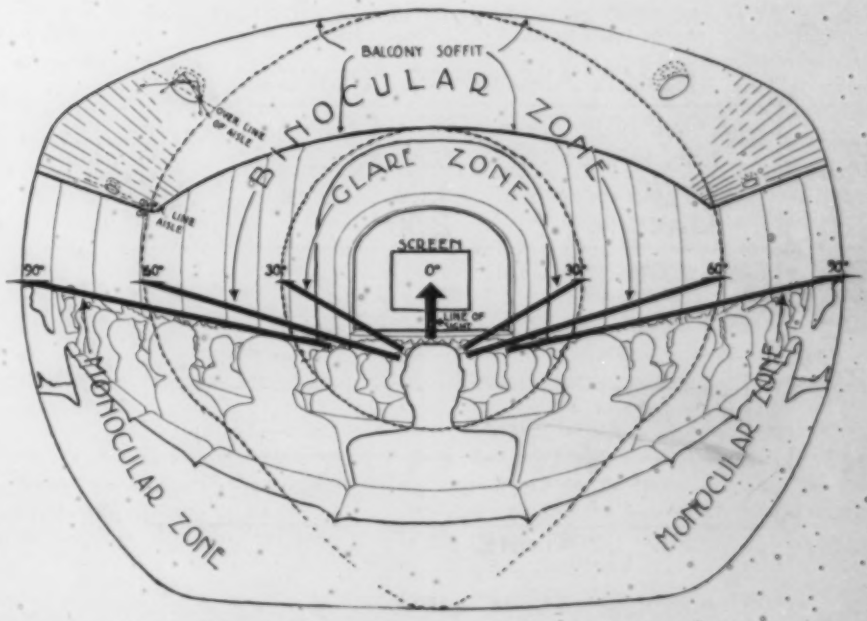


Fig. 1. *Perspective of a hypothetically average motion picture theater illustrating the field of view of a patron sitting in the position indicated in the section and plan of Fig. 3 (on page 147) by a cross. The maximum brightness at any point within 30° of the line of sight of an observer should not exceed 0.1 foot-lambert so as to give adequate viewing*

light is very uniformly distributed. This recommended value falls within the permissible range for optimum resolution of detail, but at the same time the amount of diffused light afforded does not tend to "wash out" screen images. The brightness of 0.1 foot-lambert should be continued right up to the edge of the screen.

Experiments in the Walt Disney studios were said to have shown that lighting between the screen and proscenium creates the illusion of great depth in pictures. This area should be lighted so as to appear as a pale gray mist. The lighting preferably should be uniform, but if that cannot be accomplished because of job conditions, then the brightness should be least near the screen and rise to 0.1 foot-lambert for theater walls.

Light Distribution

In order to attain satisfactory house lighting while the film is running, the distribution of light must be carefully controlled because the brightness level of 0.1 foot-lambert must be the actual maximum brightness at any point within 30° of the line of sight of a patron watching the screen (Fig. 1). This control not only will involve the careful selection of location for the light sources, but also the careful choice of materials for walls, ceiling and floor to reflect the proper quantity of light efficiently and thus permit the use of small lamps having very low brightness.

The lighting problem eases somewhat as screen brightnesses become higher. If, for example, colored films replace black-and-white entirely, house lighting can be about double the 0.1 foot-lambert value.

A brightness of 0.1 foot-lambert is too low for patrons' eyes to adapt to quickly when they come from outdoors, unless there is a long foyer in which the lighting intensity decreases steadily as the people move along.

Some improvement in the situation can be obtained in any case if the brightness of foyer surfaces at the end of the theater is set at 2 foot-lamberts. This should be succeeded by a brightness of 1 foot-lambert for the surfaces of the extreme rear of the auditorium behind the last row of seats (the crossover). This 1 foot-lambert brightness should decrease to 0.5 foot-lambert on the aisle floors within 10 ft. of the rear end of the aisle, and to the prevailing 0.1 foot-lambert within 20 ft. From then on, up to the front of the auditorium, the floor brightness of the aisles should remain at 0.1 foot-lambert. This arrangement of brightnesses is illustrated in Fig. 3 with a suggested system of lighting outlets to accomplish it.

Control of Lighting

Higher house brightnesses would be possible if motion picture theaters were designed to permit them. This might sometimes require the screen to be louvered or hooded (after the fashion of traffic lights, or the miniature screens used for sales promotion in camera stores). At first thought, louvering would appear to reduce the number of seats by narrowing the angle of view, but this would not be necessary because the principal louvering would be against the ceiling to prevent the direct illumination of the ceiling lights from striking the screen. The actual amount of hooding required could also be reduced by sinking the lights into the ceiling, so that the depth of the coffer acts as a louver against the screen (see Figs. 1 and 3). The coffering would have the advantage of hiding the main ceiling lights from the balcony patrons.

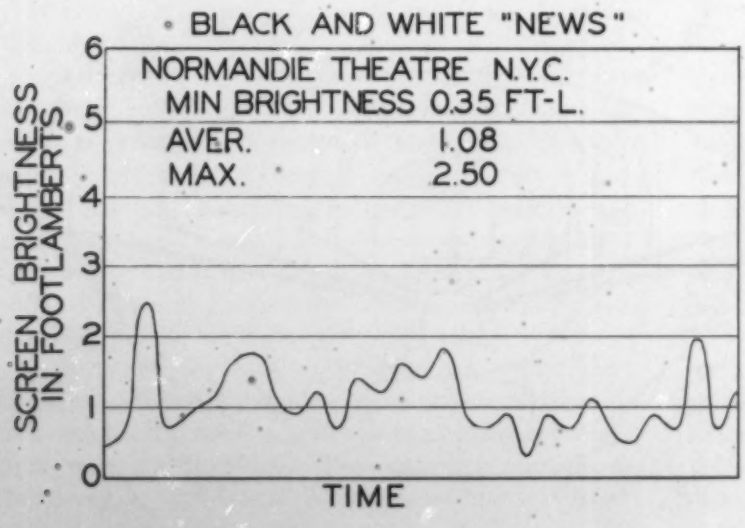
An examination of Figs. 1 and 3 will show that such ceiling lights in the main ceiling cannot come into the field of view of any patron on the main floor as long as none is placed in the forward 30 per cent of the ceiling. This prohibition also prevents stray light of the ceiling sources from reaching the screen.

Figs. 1 and 3 also show that the lights in the main ceiling and those in the balcony soffit, when recessed in properly designed coffers, are hidden from most patrons. In the few cases where the lens can become visible, it is at the upper edge of a patron's field of view where it is farthest from the line of sight, and the least effective in reducing visual efficiency and comfort. The sides of the light coffers should be painted dark gray to prevent them from being bright enough to disturb patrons. Concealed downlights also could be used. In many theaters the use of lens units in coffers or downlights would be sufficient, in combination with the fact that screens are usually placed 6 to 10 ft. behind the proscenium arch, to make special louvering of the screen unnecessary.

In addition, it would be desirable to give all surfaces that are parallel to and face the screen, such as the balcony face and rear wall of the theater, a low reflecting finish (about 20 per cent) to make their contribution to screen brightness negligible. Surfaces parallel to, but facing away from the screen, such as the backs of the seats, should be given a reflection factor about equal to the floor, or 30 per cent.

Finally, the walls and ceiling should be sloped away from the screen as far as possible and given a ribbed surface. One side of each rib should face away from the screen and be given a reflection factor of 50 per cent. The other side of the rib that would face in the general direction of the screen could be dark gray

Fig. 2. *Graph shows sequence of brightness changes for type of film used to relate theater interior brightness to that of the screen. Since one-tenth of average screen brightness can be the value allowed for the interior surfaces, the standard level recommended for theaters is 0.1 foot-lambert*



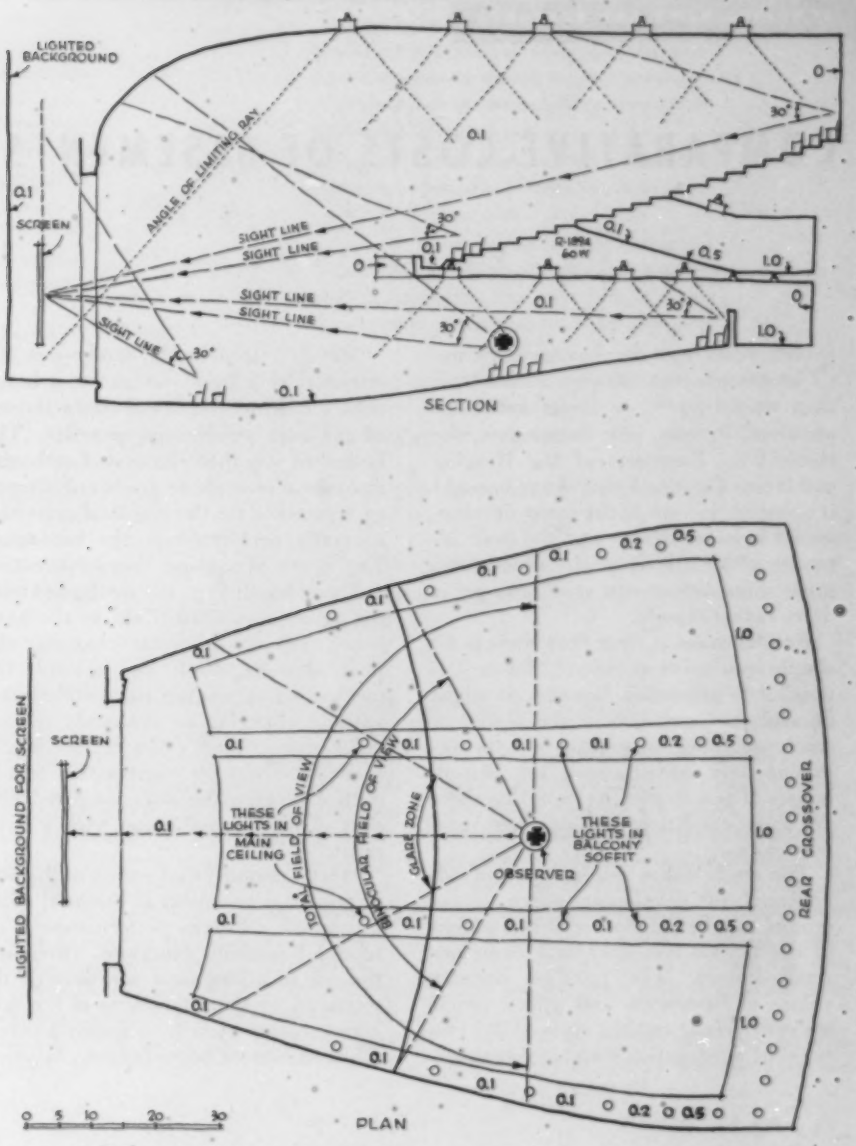


Fig. 3. Section, plan of theater showing recommended brightness values and suggested lighting arrangement to attain them. Section gives sight lines of closest and farthest observers and of an observer (indicated by the circled cross) in what is termed a "standard" position. Indicated on the section are the 30 degree angles made with the sight lines, showing that no luminous part of any lighting unit comes within this angle. Finally it shows that no direct light from a lighting unit can reach the screen. Figures 0.1, etc., are the brightness levels in foot-lamberts

with a 10 per cent reflection factor. This permits light to be accepted by these surfaces without its getting back to the screen. Floor coverings should have a reflection factor of 30 per cent.

Ceiling lights should begin no closer to the screen than about one third the depth of the house. They should be arranged throughout the remaining two thirds of the ceiling over the aisles so that the aisles would get the benefit of the principal illumination and no patron could be directly under a light to receive a high light on back of head and shoulders that might be disturbing to others. This also would light up the walls when the side aisles run along the walls. Where there are no side aisles, the lights should also run in such relation to the walls as to light them uniformly. Similar lights should be installed under the balcony (over the aisles), and along the back crossover.

Illumination on the ceiling would be diffused light coming from the walls and floor. If the ceiling were finished white it would acquire a brightness about equal to moonlight.

It would be desirable to raise the ceiling brightness to 0.1 foot-lambert, but most attempts to do this raise more problems than they solve. Where the scale of the interior permits lighting the ceiling, it can be done by a series of similar, well-designed, stepped coves. This is impractical in the average motion picture auditorium, and it is better to let the ceiling remain dark than to run into the great brightness variations that accompany most attempts at ceiling illumination.

It is easier to meet the visual requirements of continuous motion picture theater lighting with incandescent lamps than with fluorescent, as the extraordinary degree of control required is difficult with fluorescent. Fluorescent lighting can be used for the decorative and intermission lighting. Furthermore, the incandescent equipment can be dimmed easily so that after the computed installation is made, the exact point at which the house lighting no longer handicaps the screen can be determined by experiment.

In conclusion, the brightness level of 0.1 foot-lambert suggested for house lighting (about three times full moonlight) would call for an illumination level of from 0.3 to 0.4 foot-candles, on the basis of the reflection factors recommended. This can be secured, from 60-watt, incandescent lamps on about 15-ft. centers average, in controlled, coffered, direct-lighting equipment. Where the brightness level is to rise, as at the rear stretch of the aisles and the rear crossover, the lights should be spaced proportionately closer.

COMPARATIVE COSTS OF BASEMENTS VS. UTILITY ROOMS

SOME years ago the basement-vs.-no-basement cost debate waxed and then waned again, as house architects answered it, one way or another, for themselves. Engineers of the Housing and Home Finance Agency have brought it up again, in view of the many developments in house design and the fresh intensity of all cost discussions, and have made some serious cost studies to pin it down rather closely.

Results make it clear that there is no simple conclusive answer. As far as it is possible to generalize, however, it might be said that omission of the basement can bring about substantial cost savings in one-story construction, but not in houses of two stories. Even in this there are some conditions, assumptions, and whereas's.

The study takes due account of advantages of developing space above ground to take the place of the basement in the typical one-story and two-story small houses. The relative amenity values of basements and utility rooms are considered, and the costs of the two types of construction then are compared.

The first step in the study was the selection of a basic design for a house with a basement which is characteristic of low-cost subdivision practice. The basement was then eliminated and sufficient floor area above grade substituted to accommodate the essential activities normally performed in the basement. Two ways of making this substitution are considered: first, the method of adding a one-story utility "ell" to the basic house without otherwise changing the plan above ground; and second, the method of expanding the entire house without changing its uniformly rectangular shape. Then estimates are finally made by which the construction cost of each alternative design is compared with that of the original house with a basement.

It was assumed that not all of the area of a normal basement is essential space — necessary for the performance of essential household functions. Obviously the size of a basement is ordinarily determined by the dimensions of the floor above, rather than by a family's actual requirements for house heating, laundry, storage and other common uses of this space. It is, therefore, unnecessary to reproduce the entire basement area above grade in order to determine the cost of substitute space in which all essential basement functions can be served.

In the study this substitute space is designed to accommodate such necessary equipment as the furnace, water heater, laundry tubs and washing machine. It also provides storage for trunks, boxes, screens, screen doors, garden tools, porch furniture and a bicycle. Space for laundry drying and a small children's play area is also included. Omitted, however, are those substantial areas for child and adult recreation which the average home buyer ordinarily associates with a basement.

The second assumption is that a concrete floor slab laid directly on the ground is a generally satisfactory method of first floor construction in basementless houses, provided the slab is properly designed and constructed. This assumption was founded on tests already conducted on such floors (see

Fig. 1

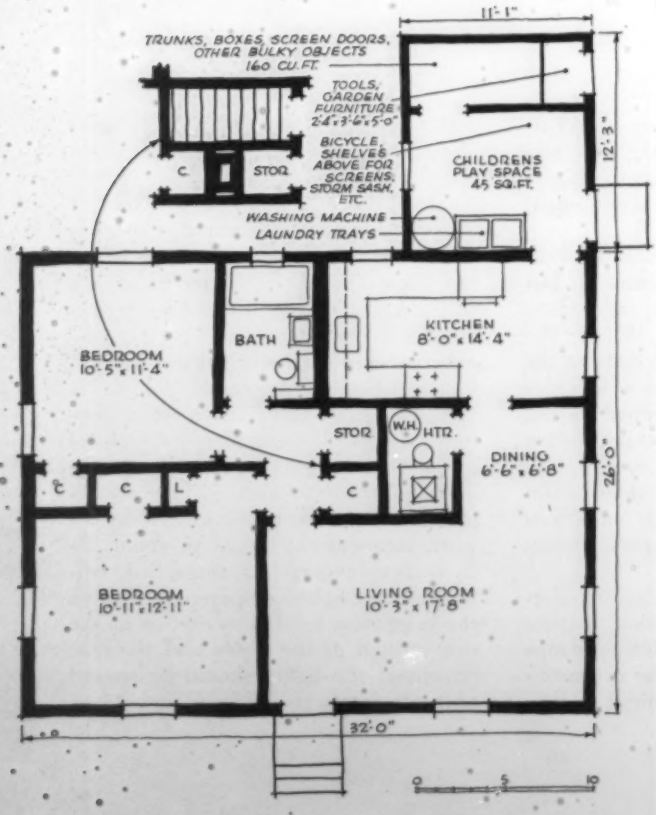
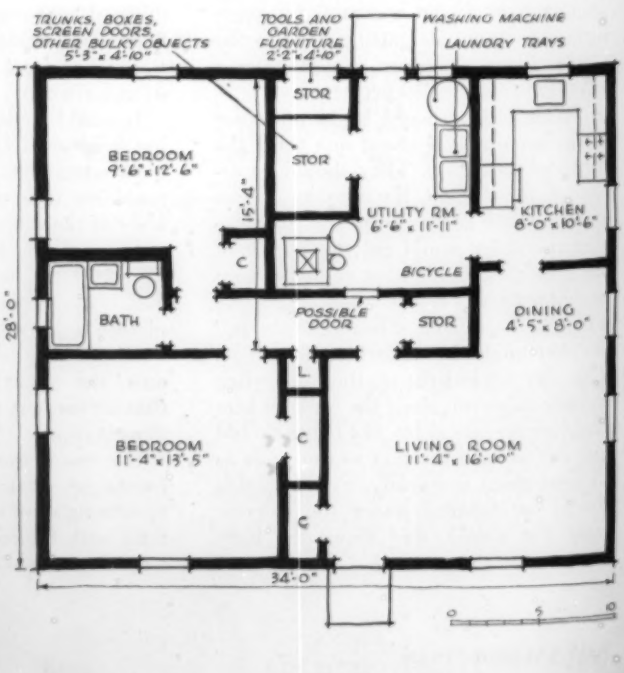


Fig. 2



SUMMARY OF COSTS*

1. House A: Basic One-Story House With Basement	$7,600
2. Basementless One-Story House A with Small Utility "Ell". (Fig. 1)	
(a) Monolithic concrete slab foundation and floor with asphalt tile floor covering ($435 saving)	7,165
(b) Conventional wood floor construction over crawl space, surrounded by continuous foundation walls with top of walls 8 in. above outside grade ($232 additional cost)	7,832
3. Basementless One-Story House A with Large Utility "Ell" Construction similar to 2(a) above	7,600
4. House B: Basementless One-Story House with Utility Space Incorporated Within the Structure (Fig. 2)	
(a) Construction similar to 2(a) above ($722 saving)	6,878
(b) Construction similar to 2(b) above ($174 saving)	7,426
5. Basementless One-Story House B — Expanded (Fig. 3) Construction similar to 2(a) above	7,600
6. House C: Basic Two-Story House with Basement	7,855
7. Basementless Two-Story House C with Utility "Ell" (Fig. 4)	
(a) Monolithic concrete slab foundation and floor, and using asphalt tile floor covering ($101 additional cost)	$7,956
(b) Construction similar to 7(a) except that wood block flooring laid in mastic over membrane waterproofing is substituted for asphalt tile floor covering in all rooms except kitchen and utility room. (Additional cost $231)	8,086
(c) Continuous concrete block foundation walls, concrete slab on ground and asphalt tile floor covering ($164 additional cost)	8,019
(d) Same as 7(c) except that wood block flooring laid in mastic over membrane waterproofing is substituted for asphalt tile floor covering in all rooms except kitchen and utility room ($294 additional cost)	8,149
8. House D: Basementless Two-Story House with Utility Space Incorporated Within the Structure (Fig. 5)	
(a) With first floor construction similar to 7(c) ($85 saving)	7,770
(b) With first floor construction similar to 7(d) ($53 additional cost)	7,908

Table is based on current costs for the Washington, D. C. metropolitan area

ARCHITECTURAL RECORD, Jan., 1948).

In order to prove satisfactory from a livability standpoint, such construction must have adequate perimeter insulation and a vapor barrier between the ground and the underside of the slab.

Besides covering details such as these, the cost estimates are based on the use of a finished surfacing material consisting of either asphalt tile or wood block flooring cemented to the slab. The latter surfacing is introduced to provide an equitable comparison with normal frame construction. (Summary of Costs, Items Nos. 7d and 8b.)

It will be noted that the two-story designs (Figs. 4, 5) include only two bedrooms, in spite of the fact that a three-bedroom design would have been more typical of conventional subdivision practice for houses of two stories. This was done in order to make the designs approximately comparable to the one-story, two-bedroom houses analyzed. Since Houses C and D, however, can be easily converted from two-bedroom to three-bedroom designs, the general conclusions contained in this article apply equally well to houses of three bedrooms.

Costs and Livability

The omission of the basement can bring about substantial cost savings in one-story house construction, but not in houses of two stories or more because the type of foundation suitable for the latter is more expensive than that suitable for the former, and because the basement of the two-story house occupies a considerably smaller proportion of its own total volume than does that of the one-story house.

In order to realize such cost savings, builders of one-story houses must use

Fig. 3

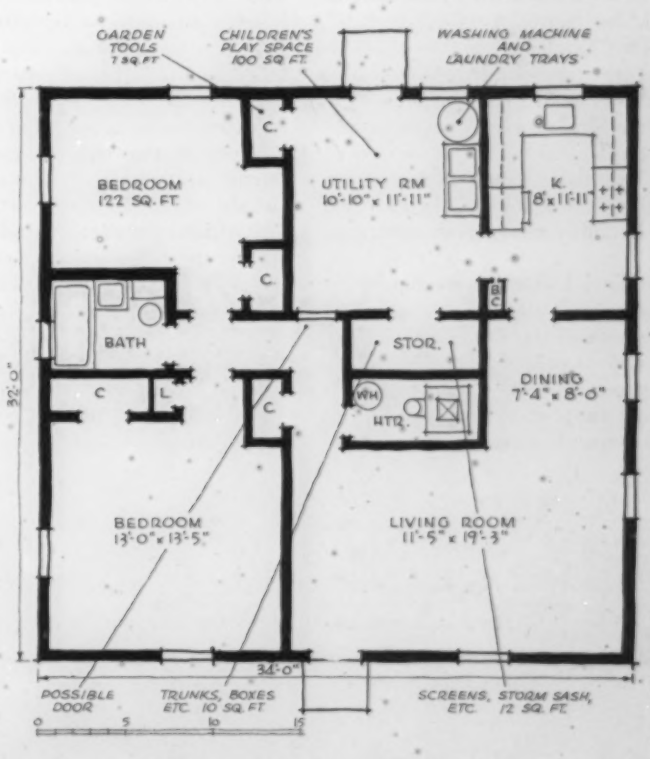


Fig. 1. *House A, one-story with utility "ell" attached. The "ell" can be lengthened to 21 ft. 6 in. for the same cost as the basic house with a basement. Arrows indicate change in plan when basement is eliminated. Space formerly occupied by stairway is used for heaters*

Fig. 2. *House B, one-story with utility room incorporated within the structure. Inclusion of new room results in differences from House A plan in the arrangement and sizes of rooms*

Fig. 3. *House B, expanded. This plan shows the additional space available at the same cost as that of basic House A with a basement*

concrete floor slab construction, which is substantially cheaper than conventional basementless construction (wood floor over crawl space surrounded by continuous foundation walls); and the utility room, together with any other space supplied above grade to offset the loss of the basement, must not be larger than necessary to accommodate essential basement functions — house heating, water heating, clothes washing, laundry drying, general storage facilities and a small children's play space.

When the monolithic concrete *slab-on-ground* method of foundation and floor construction is used, all types of one-story houses — with one or more bedrooms and with coal, oil or gas heating equipment — provide greater livability value per dollar of construction cost when the basement is omitted and when substitute facilities are located above grade. Sometimes this means that the house without a basement is considerably less expensive to build. Under other circumstances, there is practically no difference in cost between the house with a basement and the house without. The variation in the result is due to the manner of defining the amount of space considered necessary to offset the loss of the basement. Where expected savings are used to expand the utility space, however, the house with all space above grade appears to represent the best housing value from a livability standpoint even though no difference in cost is involved. This is because the basic one-story floor plan can be enlarged to include a substantial proportion of the original basement area before the cost of the house with a basement is exceeded. In House A (Fig. 1, "ell" extended to 21 ft. 6 in.) 28 per cent of the basement area can be added above grade; in House B (Fig. 3) 31 per cent.

Although *conventional* basementless construction (wood floor over crawl space) offers little or no opportunity for comparable cost reduction, it does not decrease livability nor increase cost, provided:

a. The final house is rectangular in plan.

b. The area of the utility room, plus any other space supplied above grade to offset the loss of the basement, amounts to no more than about one-fifth of the overall basement area. In a two-bedroom house, this additional space above grade would accommodate somewhat more than essential basement functions. (Summary of Costs, Item 4b. This conclusion is based on using the $174 saving to lengthen House B plan several feet, thereby increasing the area of the utility room and other spaces.)

Although a two-story house design cannot be significantly increased in livability value per dollar of construction cost through the omission of its basement and the compensatory enlargement of the house above grade (Summary of Costs, Items 7 and 8), as in the case of the one-story house, a basementless version in many instances could embody livability value approximately equal to that of the original design with a basement. And, under some combinations of soil and climate, it would undoubtedly be preferable. This simply means that the above-grade enlargement process in the case of the two-story house may provide some families with a house more suited to their needs at an equivalent construction cost, although promising no actual reduction in the total expenditure for their housing.

Site and Investment Problems

There is no single simple answer to the basement vs. no basement question, since the cost of any particular basement is always affected by the topography of the lot, the character of its soil and the climate of the region in which the house is to be built.

A particular house design, for example, could substitute an above-grade utility room for a basement with considerable cost advantage, provided this design were constructed on a relatively level lot in a moderate climate. The same design might gain no cost advantage from this substitution, however, if the house were constructed in a cold climate, or on a steeply sloping site, or both. The extreme winter temperature of the region would require the basementless house to have deep foundation walls extending below the frost line, and the steep site would require excessively high walls between first floor and grade on the downhill sides of the building. In the same way, basementless houses built on soil which is damp, uneven in quality, or otherwise poor from a design standpoint might require foundations of unusual size and greater than ordinary expense. Thus any of these three circumstances could largely offset the savings to be realized from the omission of the basement.

The basement vs. no basement problem is also affected by an important non-technical consideration, namely, the prevailing conception of investment soundness among local residential mortgage lenders. In a region where a house generally must have a basement to be considered a sound mortgage risk, good new houses usually will have basements. In other words, the argument that basementless construction saves money or increases livability, or both, is somewhat irrelevant in a locality where the omission of such a basement results in the mortgage being made to cover a significantly lower proportion of the total cost of the house. Although future efforts to cheapen the cost and improve the

Fig. 4

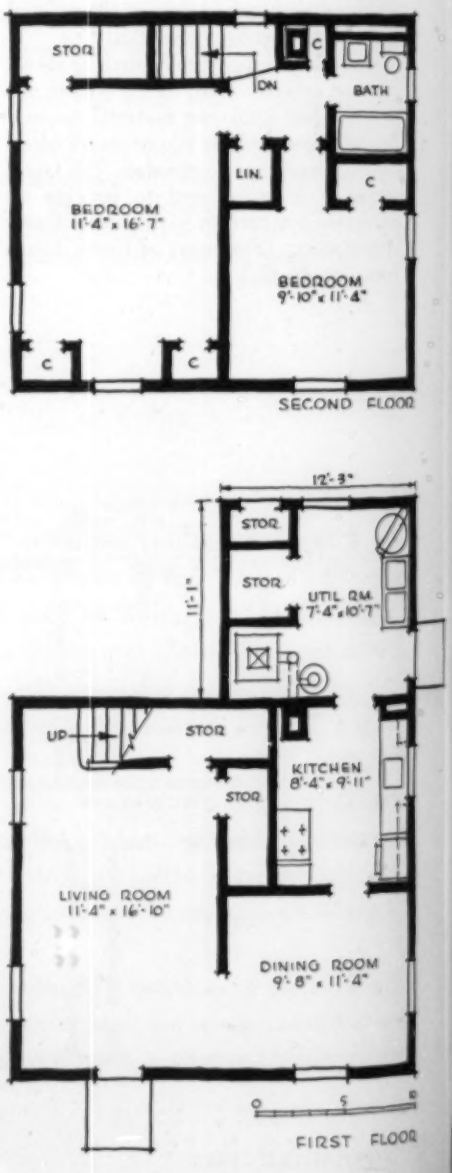


Fig. 4. *House C, two stories with utility "ell" attached. Only two bedrooms are used in order to make the design comparable to those of one story; plan can be changed to three bedrooms*

quality of basementless construction may succeed in gradually modifying such local appraisal habits, for the time being these considerations might outweigh all technical arguments in many communities, according to HHFA.

The study was developed to promote whatever economies are possible in houses constructed on relatively level lots, on good load-bearing soil, in climates no more severe than that of the District of Columbia (Lat. 39°). A large proportion of the country's available residential lots obviously conforms to these conditions. To the builders and designers of these houses, as well as to the builders and designers of houses on gently sloping lots in climates colder than "moderate" but warmer than "severely cold," the findings of this study may prove helpful in securing maximum livability value for each construction dollar expended.

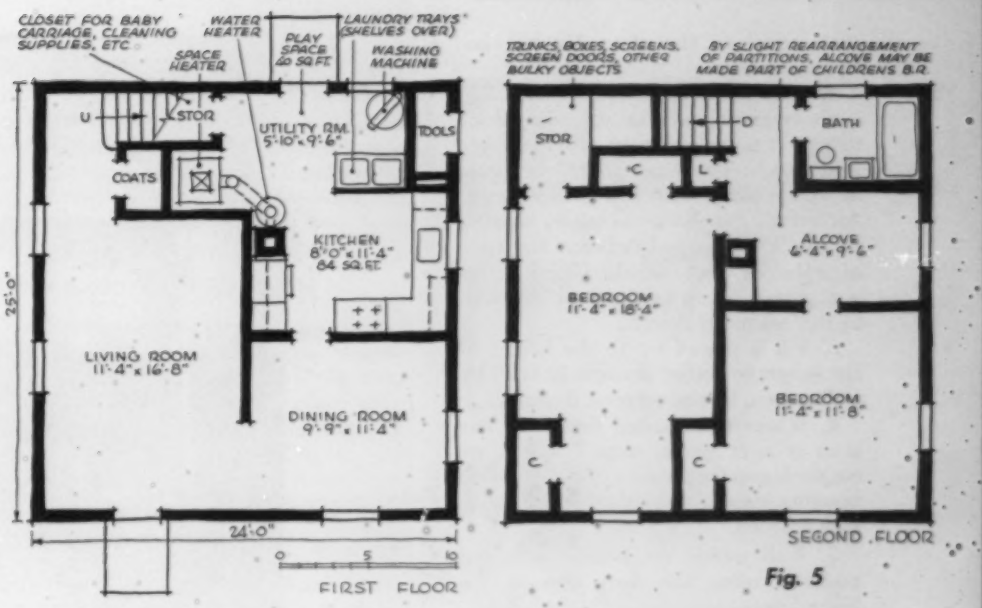


Fig. 5

Fig. 5. *House D, two stories with utility room incorporated within the structure*

PRECAST METHOD ELIMINATES VERTICAL FORMS

CONSTRUCTION of vertical forms and separate finishing of concrete surfaces are usually considered to be expensive and time-consuming processes in buildings made with reinforced concrete; so an obvious answer to reducing costs and speeding construction is a method that supplants these forms. A West Coast contracting firm, Buttress & McClellan, Inc. of Los Angeles, has developed and patented a process in which wall panels and other precast units such as roof slabs, beams and rigid frames are poured horizontally, first on the concrete floor slab and then atop each other.

After the reinforced floor slab has been poured, it is sprayed with an emulsion (to keep cast members from sticking). Low curb-like forms are laid on the slab in the shape of wall panels, and reinforcing steel, sash and door frames are placed within the forms. The walls are then poured in horizontal panels directly on the floor and are trowel finished. The resultant panel surfaces are free from form marks, and thus interiors do not have to be finished with plaster, but can be painted directly.

Wall panels are raised with a crane and are anchored by welding or by pouring a concrete column between the panels. The roof is then constructed either conventionally (wood roof) or with precast slabs. Lightweight concrete roof panels utilize pumice aggregate.

Step-By-Step Construction

Building steps vary somewhat, depending on whether the roof is made with wood or precast slabs.

Construction steps for buildings with precast concrete walls and either structural steel rigid frames, wood or steel truss roof supports, or wood rafters, and sheathing are:

1. Isolated footings are constructed for use under columns; walls are non-bearing — they act as beams to carry their own load to the footings over a

Wall panels are poured on floor slab after reinforcing steel, window and door sashes have been placed in the form. An emulsion on the floor keeps panels from sticking

span equal to the clear distance between columns.

2. Where the finished first floor line is above grade, such as at loading-dock height, it is necessary to provide lower wall panels. These are poured in forms on the ground, with inside face down. After wall panels are in place, column pedestals are poured between the ends of adjacent wall panels. These lower wall panels fit up to the floor slab and to the column pedestals.

3. Fill is placed up to the height of the subgrade within the area banded by wall-panels, for the concrete floor slab.

4. Where the finished first floor line is at or near grade, steps 2 and 3 are omitted, and the pouring of the floor slab becomes step 2, preceded by the necessary grading.

5. Wall panels are poured in a flat position, using the floor slab as the lower form.

6. Wall panels are raised into position. In some cases a concrete column is poured between the ends of adjacent wall panels. Dowels, projecting from the wall panels into the poured columns, constitute the only connection between the wall panels and other members.

Where steel columns are used, the flanges of the columns are welded at intervals to small steel plates located at the inner face of the wall panels and anchored to them. The joint between the ends of adjacent wall panels is then filled with grout.

Construction steps for buildings with precast concrete walls, precast rigid frame or precast beam roof supports, precast roof slabs, and poured columns are:

Steps 1, 2, 3 and 4 are the same as those for the buildings with conventional wood roofs.

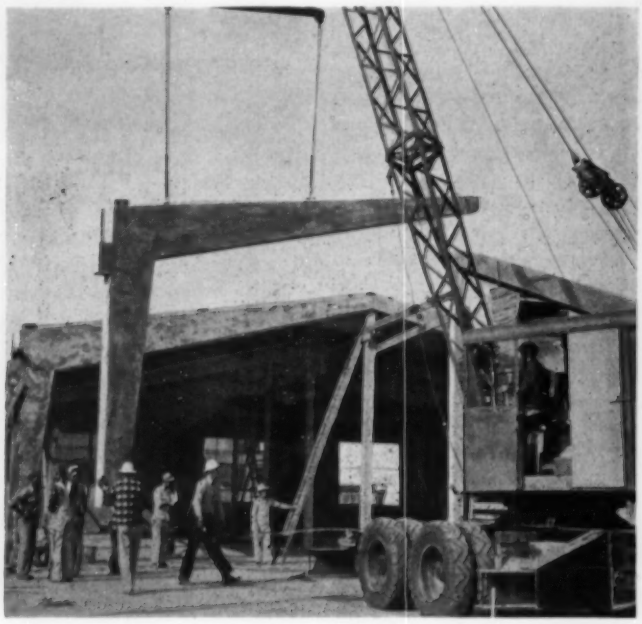
5. All precast members are poured in the flat position, using the floor slab as the lower form, except where similar members are "stacked," that is, poured one atop the other.

6. The erection sequence of precast members is such as to provide a finished building bay by bay.

7. Where poured columns are used, the connection to the walls is the same as it is for the buildings with wood roofs.

Where precast concrete columns are used, a 3 in. space is left between ends of adjacent wall panels. Dowels project into this space from the column and wall panels. A vertical bar is placed in the space and dowels of both the panels and the concrete columns are welded to it, tying the whole structure together.

8. Where roof beams are used, they are connected to poured columns by means of dowels which project from the columns through pipe sleeves provided in the beams. The space between dowels and pipe sleeves is grouted.



Precast rigid frames are cast in two pieces and are anchored to the floor by welding

Precast rigid frames are cast in two pieces, approximately of inverted "L" shape. After the frames have been erected, dowels projecting horizontally from the foot of the column are welded to bars of equal size and number provided in the floor slab. The slab bars are continuous across the full span of the frame. In order to allow for welding of the bars, a small rectangular area of floor slab at the base of the columns is left unfinished. After the bars are welded, this area of floor slab is poured.

The connection at the center between the beams of the frame is of varied design. In some cases, steel plates are anchored to the sides of the beams by means of bolts welded to the plates. After the beams have been raised, additional plates are placed over and welded to the plates of adjacent beam ends.

9. Roof panels are connected to the beams of the frame by means of welds between steel plates anchored to the beams and angles anchored to the roof slabs. At the points of connection, small rectangular holes are provided in the roof panels and are filled with grout after welding is completed.

Costs

For standard buildings, wall costs are estimated at $0.75 per sq. ft., whereas the comparable figure on the West Coast for brick is reported to be $1.10 and for standard poured concrete, $1.35 to $1.50.

On a standard warehouse building of about 10,000 sq. ft., truck height, with average lighting, plumbing, painting and a wood roof the quotation is $3.75 per sq. ft. This figure is reduced to $2.80 on jobs of 40,000 to 50,000 ft. On a Type 1 building with a concrete roof the contractors are quoting $4.50 per sq. ft. on small buildings and as low as $3.00 per sq. ft. on large ones.

Crane lifts panels when finished. Holding lugs are unscrewed after panels are placed

SLIDING DOORS

Wright-Roller Doors have been developed to provide a sliding closet door at a lower cost than standard hinged doors. They consist of plywood or asbestos fiber board panels stiffened by inserting the edges into slotted aluminum tubes and secured by gluing to wood dowels inside the tubes.

The rolling mechanism consists of a hard rubber ball which revolves on a metal axle at the bottom of the tubes. These balls roll in a concave hardwood track of the same diameter as the ball. The top of the panel slides in a slotted hardwood track. Installation consists of screwing the head track to the ceiling or head casing and the sill track to the floor, then slipping the top of the door into the head track and allowing the rollers to settle into position at the base.

The doors are available in 2 ft. widths and in 6 ft. 8 in., 7 ft., 7 ft. 6 in., and 8 ft. heights. They can be used in multiples of two, three or more. Bowers Bros. Inc., 19 W. 44th Street, New York 18, N. Y.

PAPER THIN INSULATION

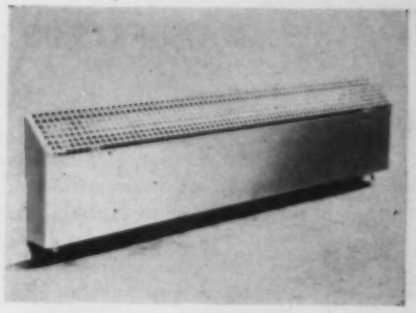
Quinterra, a paper thin, asbestos-base, electrical insulation is available in various thicknesses from a tissue-thin 1.5 mils to 20 mils for electrical wire insulation or layer insulation. Of closed structure, with no holes or interstices, Quinterra is claimed to be not only non-inflammable, but to remain unaffected by heat even when exposed to high temperatures for a long period of time. It is said to retain its high dielectric strength of well over 250 VPM at elevated temperatures. This insulation is furnished in long lengths in roll or tape form. Johns-Manville Corp., 22 E. 40th St., New York 16, N. Y.

LOW-RANGE PYROMETER

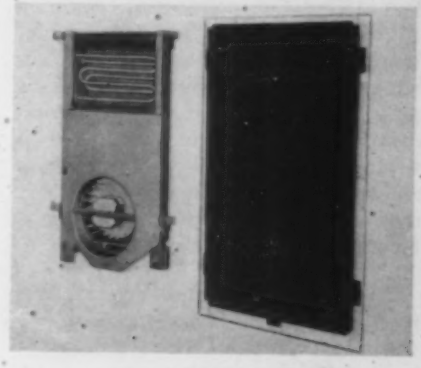
Now available is a portable, low range, surface temperature measuring instrument, the *Alnor Type 500 Pyrometer*, designed for checking the surface temperatures of panels in panel heating and cooling installations. According to the manufacturer, a new high sensitivity movement in this pyrometer makes possible its low range of only 0 to 150° F. The instrument is equipped with a manual cold end adjuster. Illinois Testing Laboratories, Inc., 420 N. LaSalle St., Chicago 10, Ill.

WALL PANEL CONVECTOR

A wall panel-type convector for steam or hot water is now available for new installations or for replacement of cast iron radiators. The unit, which can be placed either above or in the baseboard, contains steel or aluminum fins 3 in. wide by 6 in. high with two steel tube circuits passing through the section in order to give maximum heat transfer to the full area of the fins. Square openings are provided in the cover for radiation; the cover is slanted so that children cannot stand on it. Made in lengths from 18 to 116 in., the units are 8 in. high and 3 in. deep. Rempe Co., 340 N. Sacramento Blvd., Chicago 12, Ill.



Wall convectors have steel tubes running through fins to obtain high heat transfer



Recessed wall heaters contain thermostat, fan and electrical, tubular heating units

ELECTRIC WALL HEATER

Chromalox electric recessed wall heaters are equipped with built-in thermostat, pressure-type fan, and electrical tubular heating units, and are designed for installation where one or more individual heaters are preferable to a central heating system or where additional heating capacity is necessary to supplement a main heat source.

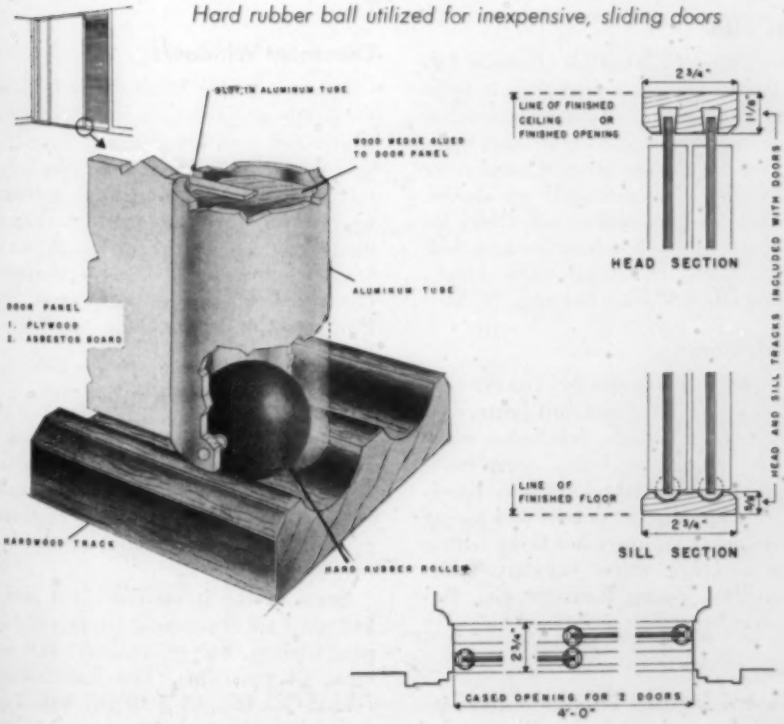
The heater is available for 236-volt a-c operation with ratings of 2, 3, 4 or 5 kw.

The unit consists of three parts — metal mounting or wall box, heater assembly and grill cover. No vents or flues are needed and only the wall box need be installed during early stages of building.

A protective thermal cutout is designed to prevent overheating of the elements in case of accidental fan stoppage, and a reset button restores current when fan operation is resumed. A three-circuit multiple snap switch also permits heater operation at partial capacity in cool weather. Thermostat control takes over when heater is working at full capacity. The fan can be operated in-

(*Continued on page 192*)

Hard rubber ball utilized for inexpensive, sliding doors



MANUFACTURERS' LITERATURE

Cork

About Cork, An Architects Handbook on Kencork. Complete information on the use of a processed cork material for walls and floors. The manual describes the origin and physical properties of cork; important topics discussed include: floor and wall installation, concrete sub-floors, wood sub-floors, radiant heated floor panel, floor protection and wall bases. Specifications are given. 16 pp., illus. David E. Kennedy, Inc., 8 and 2nd Ave., Brooklyn 15, N. Y.

Insulation

PC Foamglas, A Permanent Insulation at Low Temperatures. Brochure on the use of *Foamglas* cellular glass insulation for low temperature work, including cold storage applications. Physical properties are described and recommended thicknesses for low temperature work are listed. Typical wall, floor and roof constructions are shown. 4 pp., illus. Pittsburgh Corning Corp., 632 Duquesne Way, Pittsburgh 22, Pa.*

The Design of Insulated Roofs. Manual planned to assist architects, engineers and others concerned with the design of roofs in solving problems imposed by heat flow through roof structures. Types of *Fiberglas* insulation suitable for use above and below roof decks are described, and their proper use is outlined in brief specifications. Numerous charts and photographs are included. 36 pp., illus. Owens-Corning Fiberglas Corp., Toledo 1, Ohio.*

Venetian Blinds

Insulation by Reflection. Booklet describes the use of aluminum Venetian blinds for combined light and heat control in industrial plants, stores, offices and homes. 8 pp. The Aluminum Venetian Blind Co., 7461 S. Chicago Ave., Chicago 19, Ill.

Furniture

Dunbar for Modern. Shows Dunbar furniture as individual pieces and as groupings in the contemporary modern home. A prominent feature is the space devoted to decorative accessories which fit in with the furniture such as paintings, lamps, wallpaper and dinnerware. 24 pp., illus. Dunbar Furniture Co., Berne, Ind.

Roofing

Manufacture, Selection and Application of Asphalt Roofing Products. Book gives detailed instructions for applying various styles of strip and individual shingles, roll roofing, pattern edge roll roofing and 19 in. selvage, double coverage, roll roofing. There are instructions for roof deck construction and for construction of flashings, valleys, chimneys and soil stacks. Information is given on product selection, roof coverage and methods of estimating quantities of roofing. 84 pp. Asphalt Roofing Industry Bureau, 2 W. 45th St., New York, N. Y. 35 cents.

Plastics

A Simplified Guide to Bakelite and Vinylite Plastics. Comprehensive catalog serving as a guide to both thermoplastic and thermosetting plastics. Provides informative data on such subjects as molding and extrusion materials, laminating plastics, coatings and adhesives, impregnating and sealing materials, film and sheeting, and fibers and yarns. Physical properties are listed. 24 pp., illus. Bakelite Corp., 30 E. 42nd St. New York 17, N. Y.

Garage Doors

Wedge Tight Wood Overhead Garage Doors. Leaflet picturing special features of a new line of overhead, sectional garage doors. Specifications are included. 2 pp., illus. Calder Mfg. Co., 628 N. Prince St., Lancaster, Pa.

Glass Pipe

Pyrex Brand Glass Pipe (Bulletin IA-3). Lists various glass pipe sizes, lengths and types of fittings. Methods of installation are explained and permissible operating conditions are given. Connections to other types of materials are shown. Detailed drawings and specifications for glass parts and accessories are included. 10 pp., illus. Industrial Sales Dept., Corning Glass Works, Corning, N. Y.

Unit Heaters

Cabinet Unit Heaters by Young. Features new line of cabinet unit heaters for application in lobbies, vestibules, auditoriums, recreation halls, commercial buildings and similar locations. Specifications, installation details and piping arrangements are included along with a steam and hot water capacity table. 4 pp., illus. Young Radiator Co., Racine, Wis.*

Lighting

Planned Lighting Guide. Contains information required for application of Spero line of fluorescent lighting fixtures. This data includes candle-power distribution, coefficients of utilization, foot-candle level charts, specifications, dimensions, etc. Photographs are included for a wide variety of luminaires. 40 pp., illus. Spero Electric Corp., 18222 Lanken Ave., Cleveland 19, Ohio.*

Electrical Distribution

National Electric Plug-In Strip. Revised catalog describing and illustrating a steel, wired-in-the-factory, multi-outlet assembly with conductors for 15 amp., 125 volt or 10 amp., 250 volt service. Three pages of the catalog are devoted to detailed instructions for cutting the Plug-In-Strip on the job and for installing it in stores, offices, display windows, show rooms, assembly benches or residential rooms. 8 pp., illus. National Electric Products Corp., Pittsburgh, Pa.

Hardware

Curtain and Drapery Hardware (Catalog No. 14). Reference guide for complete line of drapery hardware; major fixtures and many types of accessories are illustrated. Photos show how the fixtures have been installed to advantage in a prominent bank and a modern hotel. 48 pp., illus. The Gould Messereau Co., Inc., 35 W. 44th St., New York 18, N. Y.

Warm Air Heating

Life Begins at 70°. Outlines the fundamental requirements of modern warm air heating systems. Seven basic factors contributing to thermal comfort and health protection are discussed. 12 pp., illus. Jones & Brown, Inc., Pittsburgh, Pa.

Casement Windows

Fenestra Inside Metal Storm Windows for Residence Casements. Folder tells how winterized windows are designed to save money on fuel bills and make homes more comfortable. Preventive measures against window glass condensation are discussed. Choice of styles in inside storm windows for various casements are illustrated. 16 pp., illus. Detroit Steel Products Co., 3113 Griffin St., Detroit 11, Mich.*

Nickel and Nickel Alloys

Standard Specialties, A Handbook of Monel, Nickel and Inconel Parts and Accessories. Approximately 200 standard products for corrosive and high temperature service are listed in this new catalog.

Some of the items described and illustrated are thermostat parts, pipe and pipe fittings, valves, gaskets, and wire rope. 24 pp., illus. The International Nickel Co., Inc., 67 Wall St., New York.

(*Continued on page 202*)

* Other product information in Sweet's File, 1948.

ARCHITECTURAL ACOUSTICS — Reverberation Time Calculations

By Vern O. Knudsen* and Cyril M. Harris†

See also "Acoustical Design of the Theater," page 139

THE reverberation characteristics of a room are controlled by the amount and placement of absorptive material. The amount of absorption in the room determines the rate at which sound will decay in it. The distribution of the absorptive treatment aids in controlling the diffusion of sound.

The first step is to calculate the reverberation time of the room by the equations given below. Next, the calculated reverberation time is compared to the optimum as given in the charts on page 159. This process shows then how the designed room compares with an optimum. If the calculated time is too great further absorptive treatment is necessary, and this can be calculated from the same equations.

Because of the importance of the proper control of reverberation in rooms, a standard of measure called *reverberation time* has been established. This is the time required for a specified sound to die away to one thousandth of its initial pressure, which corresponds to a drop in sound pressure level of 60 db.

It is given by the following equation

$$T = \frac{.021V}{S \log \frac{1}{1-\bar{\alpha}}} =$$

$$\frac{.049V}{S\left[-2.30 \log_{10}(1-\bar{\alpha})\right]} \quad \text{Eq. 1}$$

V is the volume of the room. S is the total surface area in sq. ft., and $\bar{\alpha}$ is the average absorption coefficient for the room given by

$$\bar{\alpha} = \frac{\alpha_1 S_1 + \alpha_2 S_2 + \alpha_3 S_3 + \ldots}{S_1 + S_2 + S_3 + \ldots} = \frac{a}{S}$$

where α_2 is the absorption coefficient of the area S_2, etc. For example, consider a rectangular room 30 ft. x 50 ft. x 20 ft. Suppose the average absorption coefficient of the ceiling is 0.50; the walls, 0.30; and the floor 0.10. Then

$$\bar{\alpha} = \frac{0.50(1500) + 0.30(3200) + 0.10(1500)}{6200} = .30$$

When $\bar{\alpha}$ is small compared with unity, then

$$T = \frac{.049V}{S\bar{\alpha}} \quad \text{Eq. 2}$$

It should be emphasized that when $\bar{\alpha}$ is not small compared with unity, Eq. 1 rather than Eq. 2 should be used.

Fig. 1 is useful, in these calculations, for obtaining the value of $[-2.30 \log_{10}(1-\bar{\alpha})]$ from the value of $\bar{\alpha}$.

In the above formulas, the absorption of sound was considered to take place at the boundaries of the room — the absorption in the air was neglected. However, the absorption of sound in air may be very consid-

(Continued on page 159)

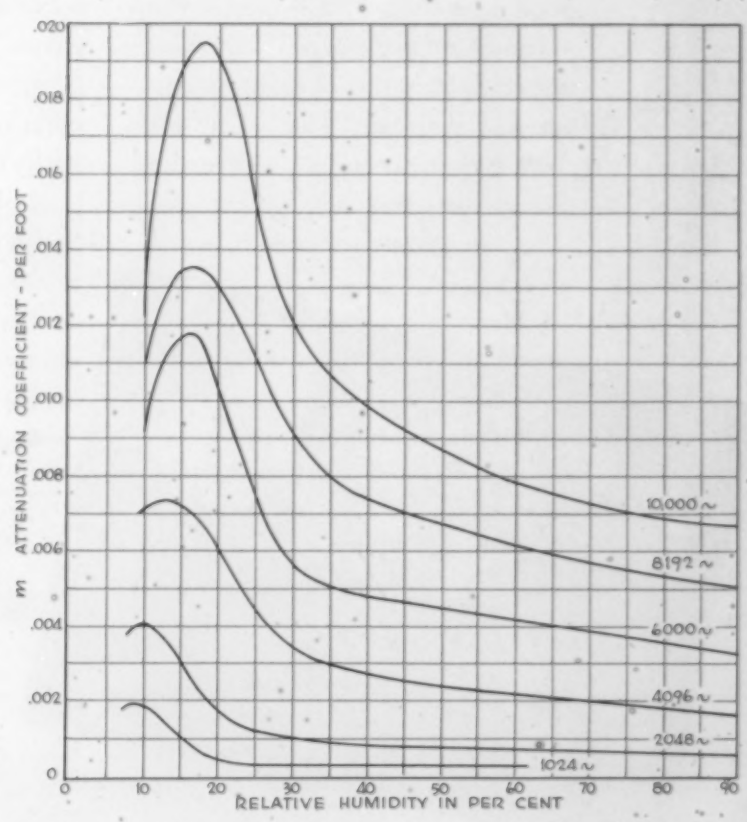


Fig. 2. If the humidity might be quite low, the room large, or the sound frequency high, it is necessary to take account of sound attenuation in the air. This chart gives an attenuation coefficient for use in Equation 3.

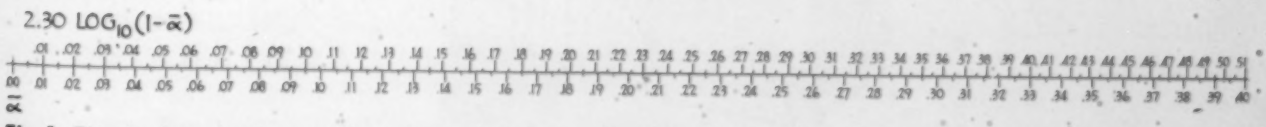


Fig. 1. This simple scale eliminates logarithmic calculations in Equation 1; for any value of $\bar{\alpha}$ merely read the whole mathematical factor on the upper side of the scale, and substitute the reading in the equation, which then becomes quite simple

* Professor of Physics and Dean of the Graduate Division, University of California at Los Angeles.
† Member of the Technical Staff, Bell Telephone Laboratories, Murray Hill, N. J.

The text and figures are taken from a forthcoming book, "Acoustical Designing in Architecture," to be published next spring by John Wiley & Sons. NOTE: reproduction of text or illustration is forbidden, except upon express permission by the publishers.

W. T. Grant Co.'s Largest Store Heated by Smith-Mills Boilers

MODERN EXTERIOR INVITES SALES
New W. T. Grant Co. Store in Syracuse, New York. Completely modern in every detail, to help customers *buy*, salespeople *sell*. Architect — P. A. Cunnius; Mech. Eng'rs. — Jaros, Baum & Bolles; Heat. Cont. — Edward Joy Co.

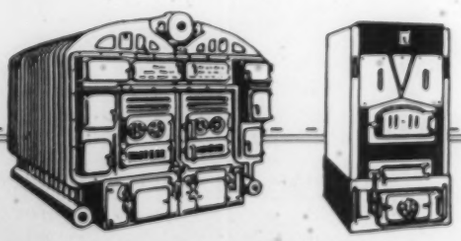
The W. T. Grant Co. chain sells millions of dollars worth of goods in an average postwar year! It isn't all gravy, however — overhead costs really eat into profits in these days of high break-even points!

But Grant management knows that *some* operating costs — like heating —can be cut to the bone . . . by selecting equipment that costs less to operate and maintain. That's why over 200 Grant stores have installed Smith-Mills *cast-iron* boilers. As a result, they're enjoying lower fuel bills, negligible maintenance costs— and better heating, to boot!

Equally important, Smith-Mills installations leave Grant greater basement area for storing, displaying or selling merchandise—because a Smith-Mills installation *takes* less space. Smith-Mills boilers are constructed of cast iron, don't need large open working space in front of the boiler for replacement of tubes.

It *always* makes sense to specify Smith-Mills for commercial, institutional, and industrial installations. And when profits hinge on lowered operating and maintenance costs, it makes *double sense.*

EFFICIENT HEATING ENCOURAGES PROFITS
Boiler room of the new Grant Syracuse Store, heated by two 24 section No. 60 Smith-Mills boilers, which *fired* by gas, deliver a total of 12,000,000 b.t.u.'s per hour.



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ARCHITECTURAL ACOUSTICS — Reverberation Time Calculations

By Vern O. Knudsen and Cyril M. Harris

(Continued from page 157)

erable, especially at high frequencies. The reverberation time formula including the effect of air absorption is

$$T = \frac{0.049V}{-2.30\,S\log_{10}(1-\bar{\alpha}) + 4mV} \quad \text{Eq. 3}$$

The second term in the denominator, $4mV$, represents the effective absorption in the room contributed by the air. When m is negligibly small, Eq. 3 reduces to Eq. 1 which does not take account of air absorption. The attenuation coefficient m at each frequency depends upon the humidity and temperature of the air. The values of m for a temperature of 68° F. are given in Fig. 2 as a function of relative humidity for a number of frequencies. Note that the attenuation coefficient increases with frequency.

Eq. 1 can be used for calculating reverberation times for all frequencies below about 2000 cycles, but Eq. 3, with the appropriate value of m, should be used for all higher frequencies. In *large* theaters, especially if the humidity is low, it is necessary to include air absorption for all frequencies above about 1000 cycles.

OPTIMUM REVERBERATION TIME

A careful consideration of the available data on the preferred reverberation-time-*vs.*-frequency characteristic for rooms, leads to the results in Figs. 3 and 4, which give the authors' recommendations. Fig. 3 shows the optimum time for reverberation, at 512 cycles, for different types of rooms, as a function of room volume. The optimum times for speech rooms, motion picture theaters and school auditoriums are given by a single line, the optimum time for music a broad band. In the case of music rooms, the optimum reverberation time is not the same for all kinds of music; the best choices for different types of music are indicated. For example, slow organ and choral music require more reverberation than does a brilliant *allegro* composition played on the woodwinds, piano, or harpsichord.

The optimum reverberation time *vs.* frequency characteristic for a room can be obtained by the use of Figs. 3 and 4 in the following manner: first, knowing the volume and purpose of the room, determine from Fig. 3 the optimum reverberation time at 512 cycles. Then, to obtain the optimum reverberation time at any other frequencies multiply the 512 cycle value by the appropriate ratio which is given by Fig. 4.

If R is the value of this ratio at a frequency f, then the reverberation time at that frequency t_f, is given by

$$t_f = t_{512}R$$

where t_{512} is the reverberation time at 512 cycles given by Fig. 3. Note that R is unity for frequencies above 500 cycles, and is given by a band of frequencies below 500 cycles. The ratio R for large rooms may have any value within the indicated band; preferred ratios for small rooms are given by the lower part of the band. The value of R to be used for frequencies below 500 cycles is not critical, but in general, it should not fall outside the indicated band.

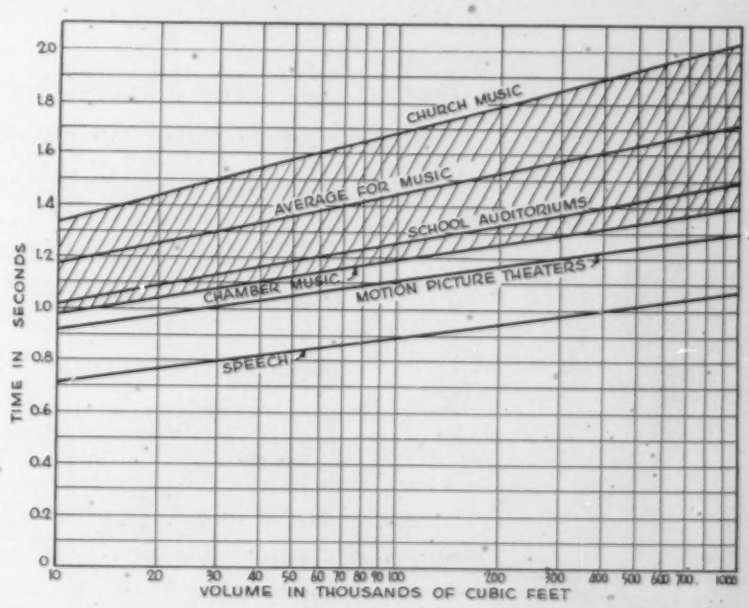


Fig. 3. *Optimum reverberation time for various types of auditoriums and for various types of sound. The values are the recommendation of the authors, and depart in some degree from earlier values frequently quoted as standards*

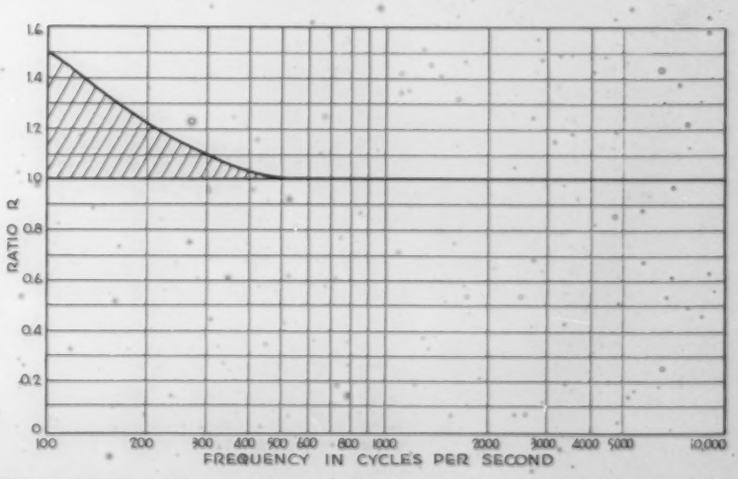
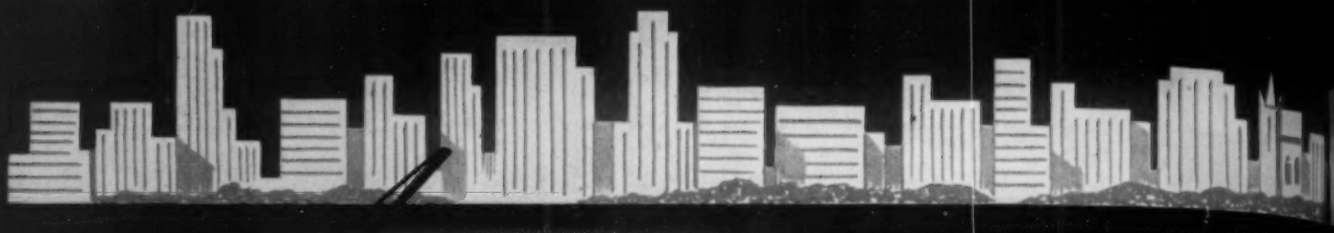


Fig. 4. *Values in Fig. 3 are all for 512 cycles. When calculating reverberation times for other sound frequencies, it is necessary to modify the equation with a Ratio R, although it only becomes important for low frequencies*



Announcing UNITRANE— the NEW Air Conditioning

Out of the Trane laboratories there comes a development that changes many long-standing notions of *what can* and *what cannot* be done with equipment for conditioning air in multi-room buildings.

This development is a device which transforms an ordinary room type unit cooler into a true air conditioner.

MOISTURE CONTROL

An ordinary unit cooler is primarily a device for reducing the temperature of air. As a part of this operation, it may also remove moisture from the air. But moisture removal is *a part of the air cooling process.* In an ordinary unit cooler it cannot be controlled separately. The Trane development provides the missing essential—independent control of temperature and moisture.

It is now possible, with a single, compact room unit, to control both sensible and latent heat in recirculated and ventilation air.

UNITRANE

The new air conditioning system which Trane engineers have designed around this dual purpose room unit has been named the UNITRANE System.

The unit itself is known as UniTrane Type MC. The symbol MC means Moisture Control.

NO DUCTS!

UniTrane—the *new* air conditioning—requires no ducts. It is a true unit system.

Each unit introduces the amount of ventilation air for which it is set—processes it—blends it with processed room air in the desired ratio—and circulates the conditioned air throughout the room.

Each room is separately conditioned in accordance with its particular requirements. Each has its own temperature control.

TRANE

CONVECTOR RADIATORS

UNIT HEATERS

HEATING COILS

PUMPS

HEATING SPECIALTIES

COOLING COILS

INSTALLATION SIMPLIFIED

UniTrane uses water as a heating and cooling medium. The same simple piping circuit that supplies warm water to the units for heating in winter also supplies chilled water to the units for cooling in summer. Changeover from warm water to cold water is automatic.

ENGINEERING SIMPLIFIED

The UniTrane piping circuit is as simple as the piping of a straight hot water heating system for any given building.

Selection and installation of units is equally simple.

Elimination of ducts eliminates the bulk of the design and application problems.

UniTrane is quick, clean, easy to handle for old or new buildings. Careful product engineering conserves the consulting engineer's time for producing an installation that exactly meets requirements.

BROAD APPLICATION

UniTrane is for ***large*** *multi-room buildings.* It is exactly what is required for hotels, hospitals, office buildings and similar structures. Each room, office or suite has its own individually controlled air conditioning the year around.

UniTrane is for ***medium-sized*** *multi-room buildings.* Since this is a true unit system, the system may be used effectively in buildings of medium size as well as in large buildings.

The UNIT OF DESIGN is the room. Whether there are 20, or 200, or 2000 makes no basic difference.

UniTrane is for ***comparatively small*** *multi-room buildings.* Any building that contains enough rooms to warrant a central boiler and a central source of chilled water is large enough for this *new* air conditioning.

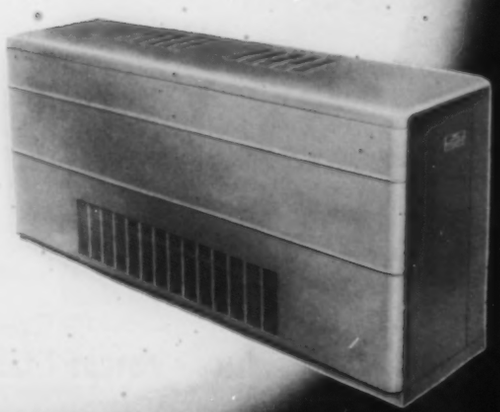
DESIGN AND APPLICATION DATA

Your Trane Sales Office now has advance data on this important Trane development. Information is being placed in the hands of architects, engineers and contractors as rapidly as possible. Regular printed data is now on press.

If you agree with Trane engineers that this new system heralds a new era in multi-room air conditioning, you will want us to reserve copies of the new data for you. We'll gladly do so on request.

THE TRANE COMPANY, LA CROSSE, WISCONSIN. *Also:* TRANE COMPANY OF CANADA, LTD., TORONTO, ONTARIO.

THE MOISTURE CONTROLLER. Designed around a series of compact axial flow heat exchangers, this entirely new and different device has made possible the development of a radically improved unit air conditioner for multi-room buildings. *Patent applied for.*



UNITRANE TYPE MC ROOM UNIT. The unit cooler, incorporating the new Trane Moisture Control element, becomes a true room air conditioner. It handles both room air and ventilation air. It controls moisture as well as temperature. It cleanses *all* air.

TRANE

HEATING AND AIR CONDITIONING

CONDITIONERS FANS REFRIGERATION EQUIPMENT BLOWER UNIT HEATERS

IF you have a Super Market, Recreation Center, Theatre, Store, Hangar, Warehouse, Industrial Plant or similar job coming up—

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STANDARDIZED STEEL BUILDING PRODUCTS

NEWS FROM CANADA

(*Continued from page 10*)

Sketch of new theater and printing plant for Richmond Hill Amusement Co., Richmond Hill, Ont. Building will be one story. Gibson and Pokorny, Architects

This Is Housing's Year

According to D. B. Mansur, president of Central Mortgage and Housing Corporation, Canada's objective of 90,000 new dwelling units will be met before the end of the year. Last year 80,000 units were built.

Mr. Mansur points out that building costs are up about 10 per cent, but this rise is partly offset by a reduction in building time (the Dominion Bureau of Statistics reports that 6.2 months were required for July completions). He states that the supply picture is in better balance than at any previous time during the postwar period. The main continuing shortages are in pipe and other building materials using steel.

Official calculations show that our production of houses is just about keeping pace with the rate of family formation at home and immigration from abroad. It would appear as though 1949 should call for an accelerated effort to reduce the shelter backlog created during years of depression and war.

Bricklayers Head South

Big money is luring Canadian bricklayers across the border. Demand has run as high as 100 men for a single construction job. From Toronto, to take a typical city, the main exodus has been to a large military hospital being built in New York State. However, at least one Toronto man has gone as far south as Texas. He reports that he gets as much for working Saturday there as he used to get for a 40-hour week in his home town.

Though the U.S. cost of living is higher, the gap between American and Canadian wage rates more than compensates for this. While it is hard to blame anyone for going where the pay is better, it is unfortunate that these skilled workers are lost to Canada, where they have been trained and are badly needed (see below: "More Mechanics Essential"). However, there is nothing

(*Continued on page 164*)

why FENCRAFT gives you

Finer Fenestration . . . at Lower Cost

Let's take cost first, since it's an ever-present problem to most of your clients.

The low cost of Fencraft* Steel Windows results from standardization. Our use of standard casement sections permits manufacturing economy without sacrificing variety in window types and sizes. In turn, installation costs are less . . . because Fencraft Window dimensions are coordinated with those of collateral wall materials.

What about window design? The strong steel sections permit extra glass area for abundant daylight. Geared Roto-Adjusters make swing leaves and ventilators easy to operate. Here's beauty—in graceful lines and fine hardware. Durability—in good steel and carefully fitted parts. Utility—in easy screening, safer washing, firesafety, better daylighting and controlled ventilation. Fencraft Casement, Projected and Combination Windows are the product of America's oldest and largest steel window manufacturer.

Result? Excellent fenestration at a cost that helps you stretch today's building dollar. For full information on the many types and sizes available, see Sweet's Architectural File for 1948 (Section 16a-14). Or mail the coupon. *Trademark

Maiatico Office Building, Washington, D. C., equipped with 1208 Fencraft Combination Windows.

Architect: Warwick & Stevens

Contractor: Jerry Maiatico

A Few Typical "Fencraft" Buildings

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Annie M. Warner Hospital, Gettysburg, Pa.

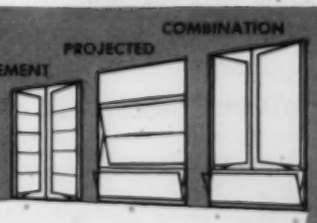
School
Katy High School, Katy, Texas

Laboratory
Sloan Kettering Institute, Memorial Cancer Center, New York City

Warehouse & Office
Sullivan, Long & Hagerty Co., Bessemer, Ala.

Factory & Office
L. C. Smith & Corona, Syracuse, N. Y.

Fenestra



FENCRAFT INTERMEDIATE STEEL WINDOWS

Detroit Steel Products Company
Dept. AR-11
2252 East Grand Blvd.,
Detroit 11, Michigan

Please send me data on types and sizes of the new Fencraft family of Fenestra Windows:

Name_____

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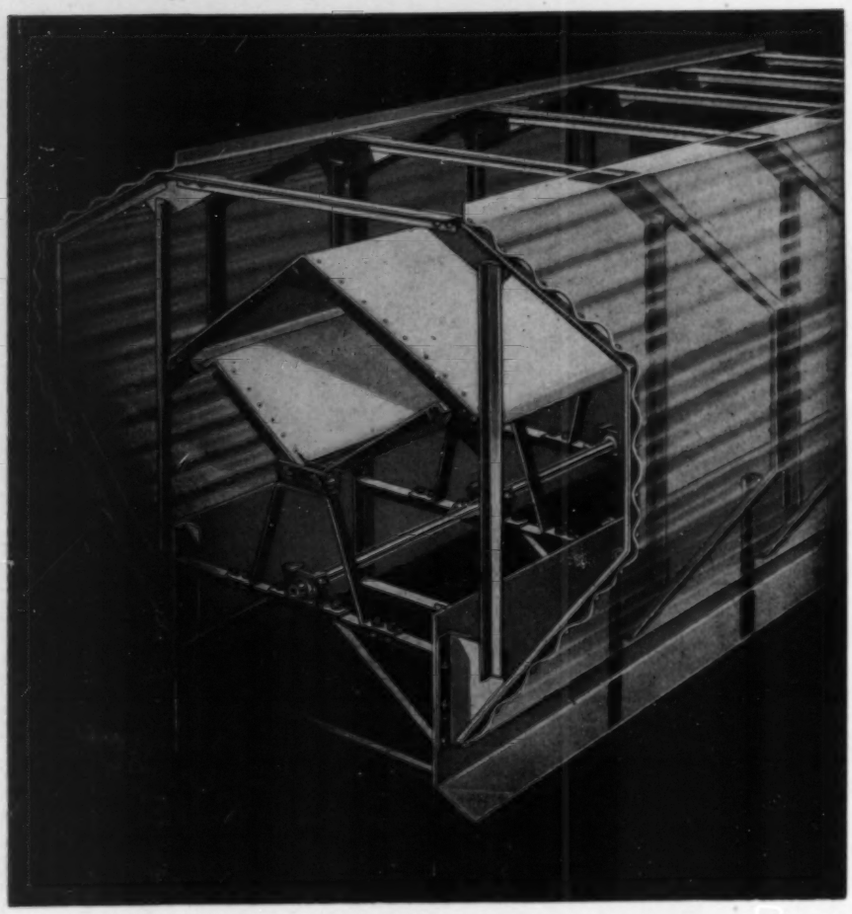

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Manpower will not reach maximum production in air that is dead and logy or heavy with heat, fumes or smoke. Improper ventilation encourages a general let-down in physical and mental energy. This is particularly true in many plants where employee productivity now is below prewar standards. Illnesses and absenteeism, lowered product quality and excessive rejects also result from unhealthful atmospheric conditions. Proper ventilation is a *profitable* investment.

Write for further information on Burt's complete line of gravity, fan and continuous ridge ventilators. There is a type and size for every need. Burt engineers are available—without obligation—to help you with recommendations and specifications, on request.

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VENTILATORS • LOUVERS • OIL FILTERS • SHEET METAL SPECIALTIES

NEWS FROM CANADA

(*Continued from page 162*)

to keep them from taking U. S. jobs providing they meet immigration requirements.

More Mechanics Essential

An even greater shortage of skilled labor is imminent in the building industry, according to a warning issued by R. G. Johnson, general manager of the Canadian Construction Association. He calls on general contractors to speed up their efforts to hit the Association's target of 2500 new apprentices each year.

At its peak, the Association's program is intended to provide the industry with 10,000 men in training, a number which Mr. Johnson says is well below absorption capacity. He points out that since the wind-up of the veterans' vocational training scheme, apprenticeship registration has shown a decided drop. Coupled with this fact is evidence that many mechanics now employed are over retirement age. And immigration does not fill the bill since most newcomers belong to the semi-skilled or laborer class.

While endeavoring to entice youthful lambs into the construction fold, Mr. Johnson urges the "shepherds" to respect present agreements as to wage rates and working conditions. Some contractors continue to bid up wages in competing locally and regionally with one another. Since wage scales differ among regions, contractors advertising high rates for migrants from low rate areas are, in effect, contributing to the inflationary spiral. With costs up 10 per cent over last year and still rising, the question is, "How much will the market bear?"

Movie Cathedral Opened

Canada's postwar theater program calls for erection of 200 new structures to purvey celluloid entertainment. Toronto Odeon, the 29th to be completed and one of the most polished links in the J. Arthur Rank chain, has just opened with appropriate fanfare. Costing $2¼ million, it seats 2400 people, has three lobbies arranged to minimize crowding, the nation's largest screen, and temperature and humidity controls which automatically adjust themselves to suit interior conditions and audience density. Other features are a full size restaurant and a "courtesy desk" where parents register their seat locations in case the baby sitter wishes to reach them during the show. The architect for Toronto Odeon was the late Jay I. English. Construction was supervised by Leslie H. Kemp.

(*Continued on page 166*)

BUY BEAUTY *by the foot!*

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YES, planning beautifully distinctive interiors is a lot simpler when you call for smart, modern METLWAL! Factory-finished in rich, natural woodgrain reproductions or baked enamel finishes . . . METLWAL will not chip, crack or craze; does not reflect harsh, metallic light; is Bonderized against rust and corrosion.

METLWAL is easy to erect, too! Erection crews merely . . . (1) attach floor and ceiling channels; (2) insert studs in channels; (3) snap on panels; (4) slip on base. All panels and parts may be cut on the job with a saw. One man can handle a full-size panel. *Only a few standard parts from warehouse stock.* No need for plaster in new construction and for filler boards of other materials at ends or above cornice level. Write today for your copy of latest catalog A-11. See how METLWAL can help you plan beautiful interiors! Address: Martin-Parry Corp., Toledo 1, Ohio.

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ENGINEERING AND ERECTING SERVICE AND WAREHOUSE STOCKS FROM COAST-TO-COAST

YOU FACE NO *Style* OBSTACLES WITH BASIC OAK FLOORING

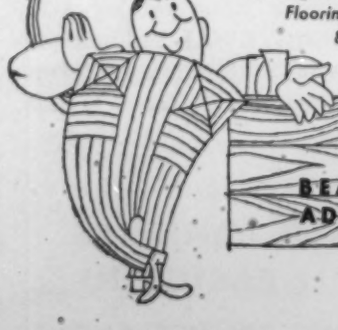
The natural beauty of oak flooring welcomes any styles or colors in home furnishings. It is especially budget-wise for those new-home builders who plan to use their present furniture at first, adding new pieces from time to time as circumstances permit.

This same adaptability permits changing of wallpaper, paint, and rugs without restraint, because the warmth and charm of oak accept new colors harmoniously. Thus wide latitude is given to fashion-leaders who wish to adopt the styles of the year or the season.

Oak is the sensible base, too, for wall-to-wall carpets. It is smooth and firm, yet resilient, giving carpets longer life, making them easier to clean. When they wear out, wholly or in spots, a quick, inexpensive return can be made to lasting oak floors.

We suggest that for complete flexibility in decor, new homes start with beautiful, durable, adaptable oak floors.

ASK FOR ARCHITECTS' DATA BOOK—*which gives quick and usable information for specifying, laying, finishing and maintaining oak floors. Available from your local oak flooring dealers or from the National Oak Flooring Manufacturers' Association, 814 Sterick Building, Memphis, Tenn.*



OAK FLOORS

BEAUTY • DURABILITY

ADAPTABILITY • ECONOMY

NEWS FROM CANADA

(*Continued from page 164*)

Toronto Study Group

An architectural discussion group has been formed by the Toronto Chapter of the Ontario Association of Architects. Its purpose is to review and discuss topics of interest to recent university graduates and persons desiring to try the Association's qualifying examinations. Emphasis is being given aspects of professional practice not included in present courses of study. These include office organization, client psychology, and technical problems in the office and on the job. Senior architects, contractors and manufacturers are actively participating in the group's meetings.

Rental Insurance Shunned?

Sufficient time has elapsed since announcement of the Dominion Government's new rental insurance program (ARCHITECTURAL RECORD, July, 1948) to assess its reception by investors and builders. So far, they appear to be less than enthusiastic.

By the end of August formal commitments covered only four projects containing 121 dwelling units. A 160-unit project was under verbal commitment, and 23 projects — totaling 1050 units — were in various stages of negotiation. It is believed that most of the units approved are in the $80 per month rental class, the maximum eligible under the scheme.

Spotlight on Good Design

Seldom has an exhibition at Montreal's Art Association gallery attracted more attention than "Canadian Designs for Everyday Living." Jointly sponsored by the National Gallery of Canada and the School of Architecture, University of Toronto, the show was aimed at making manufacturers and the public aware of the importance of good product design, thus encouraging improvement in the appearance and performance of Canadian-made articles.

A major feature of the display was a "time-and-motion study" kitchen, based on experimental work done at Purdue University several years ago. It will be recalled that Purdue experts analyzed the number of steps required to cook a meal in three well-planned kitchens using the conventional refrigerator-sink-range sequence and found the most efficient took 265. By dividing the kitchen into five activity areas — baking, vegetable preparation, meat preparation, breakfast and service — and, at the same time, decentralizing the water supply and refrigerating and heating elements, they reduced the number of steps to 70.

(*Continued on page 168*)

"I like to associate my company with adequate wiring. It dignifies my business. My customers have high praise for my wiring installations; this makes us both happy and our public relations good. I am thoroughly convinced that wiring for the needs of tomorrow will bring much more business tomorrow with a new circle of satisfied friends," says Mr. Jack Jacobs of Salt Lake City, Utah.

The sign of the times is . . .

"Certified Adequate Wiring"

PROOF ADEQUATE — another home-building project featuring Certified Adequate Wiring —the Jacobs development in Salt Lake City.

What It Means To You: Certified Adequate Wiring makes today's home buyers tomorrow's boosters. It helps you build houses that stay modern for years to come. It helps you sell houses easier and quicker because: (1) it overcomes today's buyer resistance; (2) it assures you of promotional support from your local electrical industry.

What It Means To The Home Buyer: Adequate Wiring makes even a moderate-cost house, or a remodeled home, *modern*. It provides not only for today's electrical needs but for those of tomorrow—including such things as kitchen and laundry appliances which can be covered by a "packaged mortgage."

What "Adequate Wiring" Means: An adequate electric service entrance; enough circuits, enough convenience outlets; permanent lights and switches.

Here's What You Can Do About It:

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2. Install Adequate Wiring in accordance with this layout.

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3. Obtain your "Proof Adequate"—a certificate to present with each deed.

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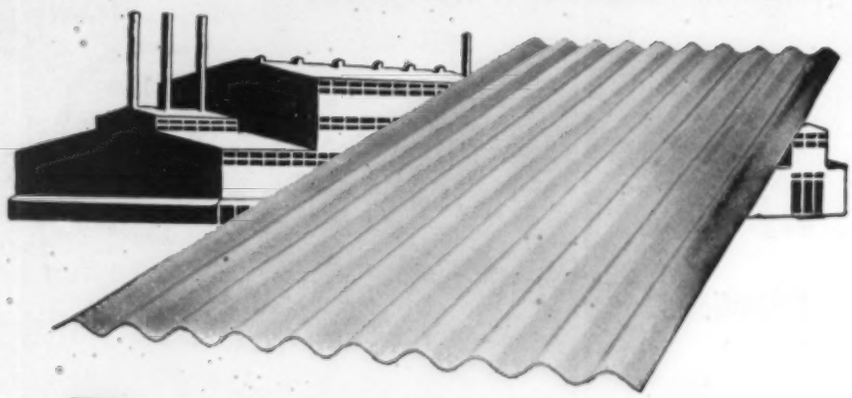
Chemical Plant Oil Refinery Paper Mill?

... or an addition?



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We are concentrating on production of this single industrial product. Stocks are now ample to make some immediate shipments. Free Engineering Service, available on request, shows how Asbestone can be adapted to your needs.

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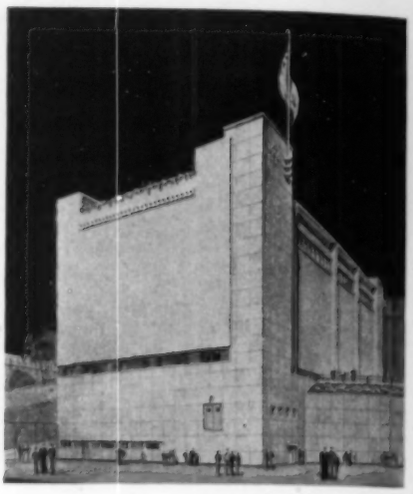
NEWS FROM CANADA

(*Continued from page 166*)



Gymnasium and auditorium for Mont Saint Louis College, Montreal, construction of which is soon to be started. The building will be two and six stories high, of reinforced concrete frame and slab construction. Raymond Dufresne, Architect

The University of Toronto went one step further. Third-year architectural students, directed by Professor George Englesmith and aided by professional industrial designers, designed the five activity areas as mass-producible units and built a full-size mock-up of the kitchen.

Government Launches Town

During the war, Ajax, 25 miles east of Toronto, was the site of one of Canada's largest shell-filling plants. It represented a tremendous investment which the Dominion Government has been reluctant to sacrifice. It has finally, through its agency, Central Mortgage and Housing Corporation, taken over Ajax. Corporation architects are now proceeding with their share of the government's plan to convert it into a prosperous peacetime community with an ultimate population of 30,000 people.

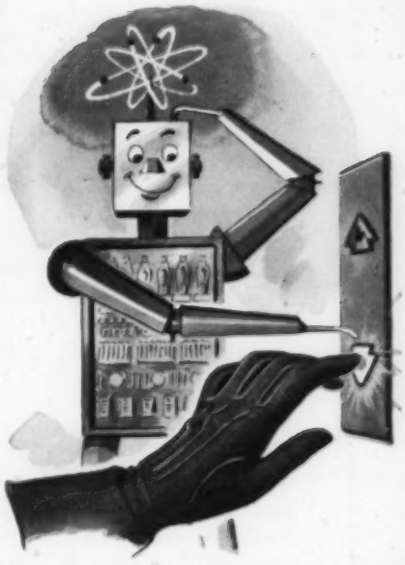
An area of 3000 acres, with a mile frontage on Lake Ontario, is involved. Hundreds of thousands of square feet of factory space are available, and roads, railways and various administration and service buildings exist, as well as 600 houses. Central heating, water and sewage disposal, fire and police protection are all provided. A major problem is, of course, how to induce industries to come to Ajax to create jobs for the residents. An extensive advertising campaign is now under way and response, particularly from British manufacturers, is reported to be gratifying.

skylines... by Otis

Seattle, a city of spectacular snow-capped beauty, is the nation's great gateway to Alaska. Seattle is venturesome. It built the mile-and-a-quarter Lake Washington Floating Bridge, the first major structure of its kind. It sponsored the world's first 'stageless' theatre. And its 42-story Smith Tower makes Seattle's skyline the tallest west of Chicago. Skyline? That's where we fit into the picture. 72% of Seattle's elevator installations are by Otis.

UNEXPECTED SALES ITEM.

Ever buy a ride on an Escalator? Shanghai shoppers did. When the first Escalator was installed in the Sun Department Store not even the police could control the amazed populace. Finally, tickets were sold at the door. Admission was thirty cents, redeemable in merchandise.



ELECTRONIC MAGIC.

Otis has successfully combined modern electronic magic with proven Signal Control features. Passengers no longer *push* a conventional landing button. Instead, they merely *touch* a plastic directional arrow. What happens? An immensely simplified electronic signalling system registers and remembers each call. And electronic circuits intercept and automatically stop the first available elevator.

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You can now install electric freight-handling at low cost. Otis Self-Supporting Electric Elevators have been specifically designed to hoist light freight two or three floors. They're inexpensive to install . . . require no penthouse, overhead supports or building reinforcing . . . can be installed in any store, laundry, storage or manufacturing building. Write for Bulletin B-720-F.

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being used, with the open plots and the large intervening areas reserved for park, playground and other community uses. Included in the plan are provisions for a large athletic field, a swimming pool, a nursery school and a miniature farm unit which will be used as a demonstration farm for the children.

All homes are being individually designed for members of the cooperative who could select their own architects from a panel that includes some of the nation's leading modern designers. In addition to Frank Lloyd Wright, who is designing five of the dwellings and all community buildings, the group includes: Paul Schweikher and Winston Elting, of Roselle, Ill.; Alden B. Dow, Midland, Mich.; Marcus Weston, Spring Green, Wis.; David Henken, New York City; Aaron Resnick, New York City; Kaneji Damoto, New Rochelle, N. Y.; Robert Bishop and John W. Wright, Jr., and Theodore Bower, Philadelphia.

New building for Evanston (Ill.) Hospital

Hospital Addition

Ground was broken early in September for a major addition to the Evanston (Ill.) Hospital. Consisting of a new six-story building to the west of the present main building, and a two-story connection with the Abbott Memorial Laboratory, the project is the first of three addi-

(*Continued on page 176*)

SIDNEY F. BAMBERGER

Sidney F. Bamberger, structural engineer and senior partner in the firm of Bamberger and Reid of San Francisco, died suddenly on September 18 at 36.

California-born and a graduate of the California Institute of Technology, Mr. Bamberger was for five years chief engineer in the Los Angeles office of Mark Falk. During the war he had charge of engineering for plant facilities for the Pollock-Stockton Shipbuilding Company, preparing plans for floating steel drydocks, later spending a year as chief structural engineer of Kump and Falk. In July, 1946, he formed a partnership with John Lyon Reid, A.I.A., and at the time of his death was engaged in the design of schools for several elementary and high school districts in California. He was a member of the Structural Engineers Association of Northern California, an associate of the American Society of Civil Engineers, and a registered structural and civil engineer in California.

WALTER H. KILHAM, F.A.I.A.

Walter H. Kilham, architect, author, and founder of the architectural firm of Kilham, Hopkins and Greeley, died in Boston on September 11 at the age of 80.

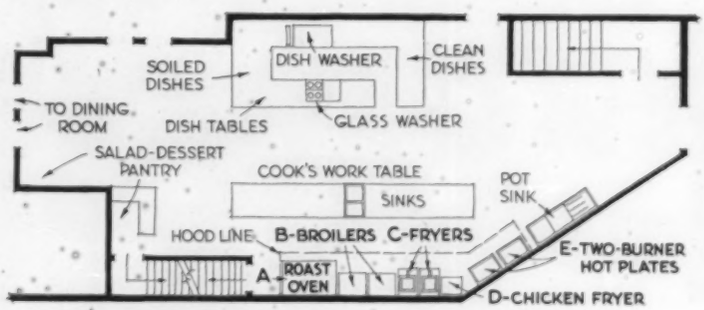
A graduate of Massachusetts Institute of Technology, where he subsequently served as instructor in architecture for two years, Mr. Kilham was well known for his work in the school field, having designed some 200 private and public schools in New England. A Fellow of the American Institute of Architects, he was the author of two books on architecture, including BOSTON AFTER BULFINCH.

KITCHEN PLAN NO. 47:

Forty-seventh of a series of successful mass-feeding installations.

KEEP FOR HANDY REFERENCE!

Alby's Steak House, South Bend, Indiana, is a 'specialty' restaurant, serving steaks, chops, fish and roasts with popular mid-western relishes. It is an excellent example of how well the "Specialized Cooking Tool Plan" fits into all types of feeding operations.



COOKING EQUIPMENT USED:

(a) 1 No. 952 Blodgett Gas-fired Roast Oven
(b) 2 Gas-fired broilers
(c) 2 Gas-fired deep fat fryers
(d) 1 Chicken fryer
(e) 2 Hot plates, gas-fired

Designed and Installed by John F. Anderson, The Stearnes Company, Chicago, Illinois

In this installation all of the onerous bending, stooping and lifting connected with cooking beneath the range tops has been eliminated. All work is done at comfortable, fatigue-eliminating levels.

The No. 952 Blodgett Oven here installed has two separately heated, 42" x 32" x 12" compartments, the equivalent of more than four range ovens! For details and specifications, write to

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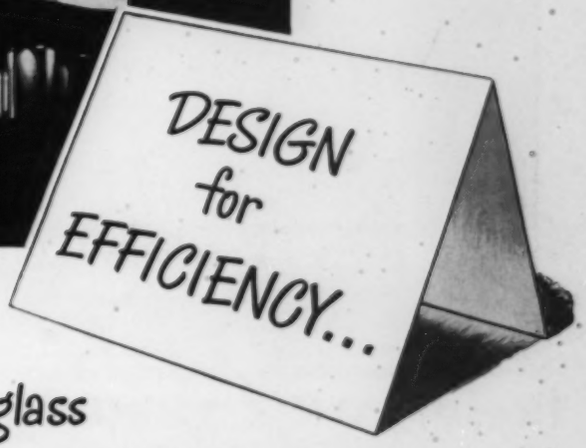
Striking in appearance . . . and practical, too. *Thermopane* permits large areas of glass without worry about excessive heat transfer. View below shows lobby through large units of *Thermopane*. Architect: J. Harris Armstrong, Kirkwood, Missouri.



walls of *Thermopane* insulating glass

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For the window walls in their new headquarters, the American Stove Company chose *Thermopane** for trouble-free glass insulation, year-round comfort, lower heating costs, more efficient air conditioning. Where building needs call for transparency for daylighting or display and effective insulation, *Thermopane* is the logical answer.

That's why *Thermopane* appears increasingly in specifications for commercial buildings, factories, schools, hospitals and homes. Here's double glass, with dehydrated air sealed between the panes by Libbey·Owens·Ford's *Bondermetic* (metal-to-glass) *Seal**. Use it in large windows or small, in metal or wood sash, in fixed or opening types.

L·O·F Glass Distributors have *Thermopane* readily available in more than 70 standard sizes . . . and can assure prompt delivery of special-size units. For more information, including standard sizes and facts on insulation, write for our *Thermopane* book and Data Sheets by Don Graf. Libbey·Owens·Ford Glass Company, 22118 Nicholas Building, Toledo 3, Ohio.

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 (*Continued from page 170*)

tions planned in the hospital's expansion program. Schmidt, Garden and Erikson are the architects.

The new building will add 92 beds to the hospital's total in private rooms and two- and four-bed wards. It will also include a large x-ray department, additional operating rooms, office facilities for doctors, service rooms, enlarged quarters for the Auxiliary Shop and a "snack bar" for visitors and the staff. The laboratory addition will double the present space of the Abbott Memorial Laboratory.

Next in line in the expansion program will be a maternity building, to be followed by new facilities for psychiatric care and tuberculosis, a pediatrics division, and dental and tumor clinics.

Housing Developments

Architectural plans for Glenwood Houses, an 1188-apartment development, one of the 16 public housing projects to be built without cash subsidy under New York Mayor O'Dwyer's new veterans' housing program, have been filed with the department of Housing and Buildings. The Brooklyn project will consist of 20 six-story cross-shaped buildings, to house approximately 4274 persons.

Every apartment will have at least two exposures, and the larger units will have three. The buildings will occupy only 18 per cent of the 22.4-acre site, the remainder being landscaped. A nursery school with its own playground will be provided, along with a health center, craft rooms, a central laundry, carriage rooms and storage rooms. In addition to the nursery school playground there will also be a 1.5-acre playground with wading pool, baseball diamond, etc., land for which was given to the city by the Housing Authority, and which will be developed and operated by the Park Department.

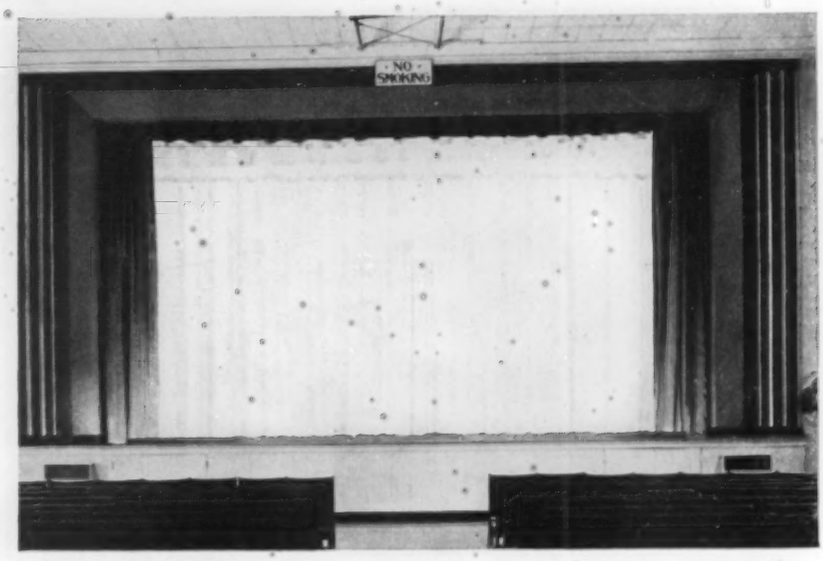
The apartments are expected to rent for about $17 per room per month, including utilities. Architect is Adolph Goldberg.

Architects' Office

Tired of commuting to downtown Chicago and wrestling with the parking problem, the members of the architectural firm of Frazier & Raftery have moved their offices to their own, specially designed building in suburban Geneva.

The building was designed to be in keeping with the suburban atmosphere, and was placed deliberately on a small lot where there would be little grass to cut and a minimum of landscaping. It is one story high, uses insulated brick and glass walls, has a flat roof, radiant hot water heating. One full wall and all windows are of Thermopane.

Offices of Frazier & Raftery, Architects



Auditorium installation in Norfolk Naval Hospital, Portsmouth, Va. Proscenium curtain in plum satin stripe, cyclorama curtain in gold chevron Fiberglas. Installed by L. B. Sheffield, Richmond, Va.

These NON-COMBUSTIBLE curtains *never require flameproofing!*

At best, the flameproofing of combustible fabrics woven partly or wholly of organic fibers affords only temporary protection. Its efficiency depends upon the type of chemical used to flameproof the organic fibers, and the length of time since the last treatment.

Fiberglas* decorative fabrics are woven entirely of finely spun, inorganic glass filaments. They CANNOT BURN, smolder or propagate flame. If exposed to fire they will not deplete the oxygen in the air or emit suffocating smoke and fumes. They are immune to rot or decay. *Always operate at 100% efficiency.*

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*T.M. Reg. U. S. Pat. Off. Owens-Corning Fiberglas Corp.

The prime purpose of any panic exit device is to let people out in emergencies. But the emergency may not come for ten years, or 20 years, or 40 years. In the meantime the panic device must stand up under millions of operations. The illustration above is imaginary, but there is nothing imaginary about the punishment a panic device takes on a high school door when the 220-pounders leave for football practice. That is real . . . and plenty rugged!

Making a panic device strong enough to stand up under emergency demands is a fairly simple matter. But giving it the endurance to first take the millions of operations . . . and then withstand emergency shocks . . . takes far better engineering and far better parts. That is why we make Von Duprin parts of drop-forged bronze, why we make the mechanism so simple and direct in action . . . the parts so heavy . . . the bearings so big.

Von Duprin drop-forged devices take the years of punishment with so little wear that reserve strength is abundant for any conceivable demand. In the long run they save money as well as lives. Insist on the genuine.

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Von Duprin PANIC DEVICES ASSURE SAFE EXIT

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SELF-RELEASING FIRE AND PANIC EXIT DEVICES

and material costs will return to pre-war levels. Nor is that necessary in order to attain our objective, because average incomes have risen in that period too.

"But it is necessary that the price of modern, safe, livable shelter be reduced, if private enterprise is to meet the housing needs of the people; if a slump in the high level of building activity is to be avoided; and if we are to make the progress in improving our communities that American standards require."

He posed alternative solutions of the price problem. It will be resolved, he said, in one of these two courses: (1) The painful course of depression, with sharply reduced markets for building material and labor, or (2) A planned cooperation of all elements in the industry toward producing many economies.

But up to now in 1948 the housing market has continued firm in all respects and home builders are sailing along toward completion of their most productive year. There is much talk about a tightening mortgage market; and there is basis for belief this drying-up of easy loan money might reflect in a changing production record later on. No contraseasonal boom in housing, as was started in August of 1947, was looked for by the trade this year—there was a parallel between these two conditions.

Housing starts as reported by the Bureau of Labor Statistics dropped sharply in August of 1948, down to 83,000 according to preliminary estimates. This was 12 per cent under July and 3300 units under August of 1947. The cumulative total of 646,000 new permanent units started this year through August, however, placed the current production 24 per cent ahead of the volume registered in the first eight months of last year.

Everyone connected with the industry seemed to feel that the August decline was a normal seasonal pattern fluctuation. Realtors suggested that one influence might have been the fact August occurred in a valley between cancellation of the old Federal Housing Administration Title VI program and starting of the new one passed by Congress that month. The old Title VI ran out in May, but enough applications were backlogged to hold starts at a high level, relatively, through August.

Freight Rate Boost Asked

Against this background of housing progress and amid the efforts to lower costs came another request by the railroads for a freight rate increase — 8 per cent, this time, on the average.

This latest carrier petition to the Interstate Commerce Commission is based on the same premise as previous requests — that increased operational costs are making higher revenues a necessity.

At the same time, the railroads announced that 13 Shippers Advisory Boards, surveying 32 principal commodity fields, expect an increase in fourth quarter carloadings of basic construction materials over the same period of 1947. Anticipated increases as announced are 9.9 per cent for lime and plaster, 7.8 per cent for gravel, sand, and loam, 6 per cent for cement, 5.8 per cent for iron and steel, 4 per cent for other metals, 3.6 per cent for lumber and forest products, 3 per cent for brick and clay products, and 2.8 per cent for ore and concentrates.

Decreases are looked for in a number of commodities, but these are mainly foodstuffs and include no building items.

Increased hauling rates would mean increased construction costs not only

(*Continued on page 180*)

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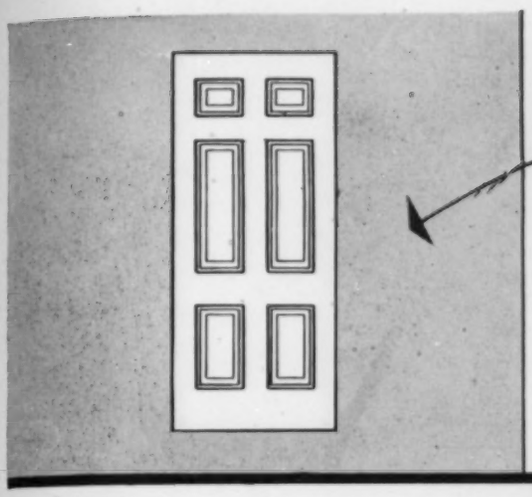

This traditional six-panel colonial door, appropriate to homes of a variety of architectural styles, is one of many Ponderosa Pine designs. The line includes glazed doors, Dutch doors, louver doors, French doors, flush doors and mirror doors. Use the booklet "Today's Idea House" to choose exactly the right Ponderosa Pine door for your purpose.

Doors FOR A Dream House

Look into the dreams of most prospective home owners and you'll find that the traditional style is a favorite. Panel doors of Ponderosa Pine fit into that dream—because they express an authentic charm that comes from clean lines, correct proportions and careful workmanship.

Ponderosa Pine doors, too, easily fit into the building budget—thanks to modern mass production methods. They are available in many styles including pre-fit sizes. And because Ponderosa Pine, as a wood, is so lasting—because it takes paint and other finishes so easily and holds them so firmly—doors of Ponderosa Pine keep their beauty through the years.

To show you the many possibilities in the use of Ponderosa Pine doors and windows, we have prepared a 32-page fully illustrated booklet—"Today's Idea House." You'll want this booklet as a source of inspiration and ideas—and a copy is yours for the asking. Just mail the coupon!

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Address.....

City..... *Zone*..... *State*.....

for housing, but for commercial and industrial building and all types of work. Such heavy users of sand and gravel as highway and airport builders would be among those more severely affected.

Dispersion of Industry

If the plans of the National Security Resources Board are carried out, these freight hauls, at least for industrial and allied construction purposes, will be to points quite remote from production centers. The program for urging private industry to do its new plant construction in regions safely removed from "target areas" no longer carries any air of mystery about it. NSRB is engaged in an educational effort — persuading industry that it will be to its own best interests, and serve the ends of government as well, if it will place new factories away from heavily populated locations. Some 25,000 industrial plants have just received a booklet entitled "National Security Factors in Industrial Location." This offers guides for the development of a pattern of industrial dispersion consistent with economic advantage and adequate for protecting the country's industrial plant in the event of war. So said Arthur M. Hill, NSRB chairman.

No widespread relocation of existing industry is anticipated as a defense move. This became clearer when Hill said:

"With industrial building now estimated at an annual rate of from $12 billion to $15 billion, we believe that most of the dispersion we consider feasible can be accomplished within the framework of normal expansion and replacement of obsolete facilities."

Meanwhile, over at Federal Works Agency, Assistant Administrator James W. Follin pointed out that for many decades there has been a marked trend toward decentralization of industry and population. Central cities have stopped growing, he said. Industry has increasingly chosen suburban and independent small communities in the relocation of its new plants. Also, many outstanding industrial leaders have endorsed decentralization despite raw material source, labor supply, market proximity and similar complicating problems.

Follin believes that this trend can facilitate the relocation of industry for security reasons.

But, if industrialists face new complexities because of this dispersion plan, architects and engineers who prepare plans for these installations will have their own adjustments to make too. Plant and equipment located in a small town or by itself in the country can call for altogether new space arrangements.

A just-completed survey by Securities Exchange Commission and the Department of Commerce indicates American business (exclusive of Agriculture) will spend $9.6 billion in the last half of 1948 for new plant and equipment, $4.7 billion of this in the final quarter. These expenditures will continue industry outlays that have held "relatively stable" for a year.

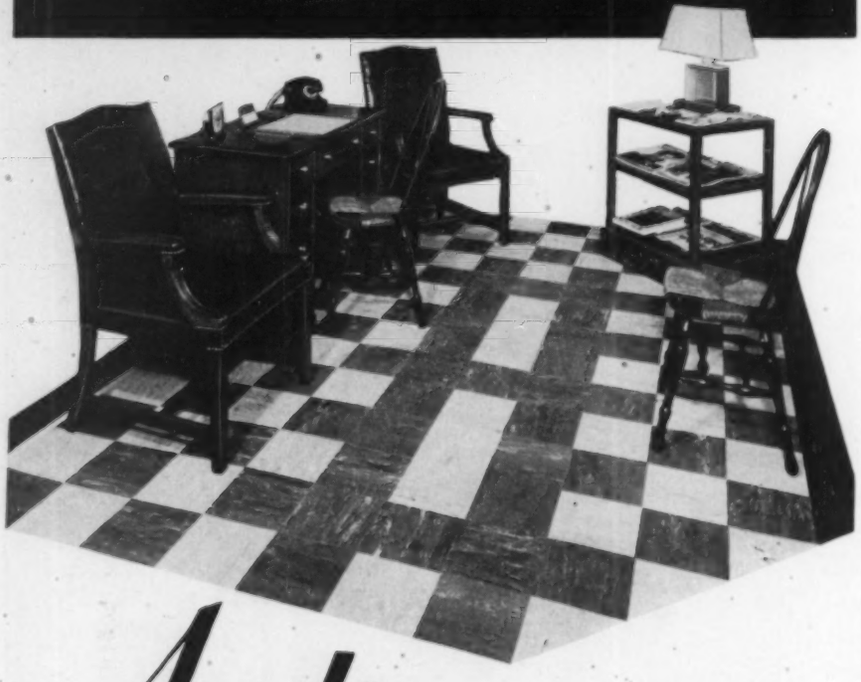
Pollution Control Progressing

FWA's Bureau of Community Facilities and the Public Health Service of the Federal Security Agency are going ahead with groundwork for the sizeable water pollution control program. Though no funds for grants for planning treatment buildings or for construction loans have been appropriated, Congress in Public Law 845 authorized these two agencies to spend $22.5 million a year for five years toward cleaning up America's interstate streams, rivers and lakes.

Details of administration now being drafted will guide states, municipalities,

(*Continued on page 182*)

Where appearance counts....



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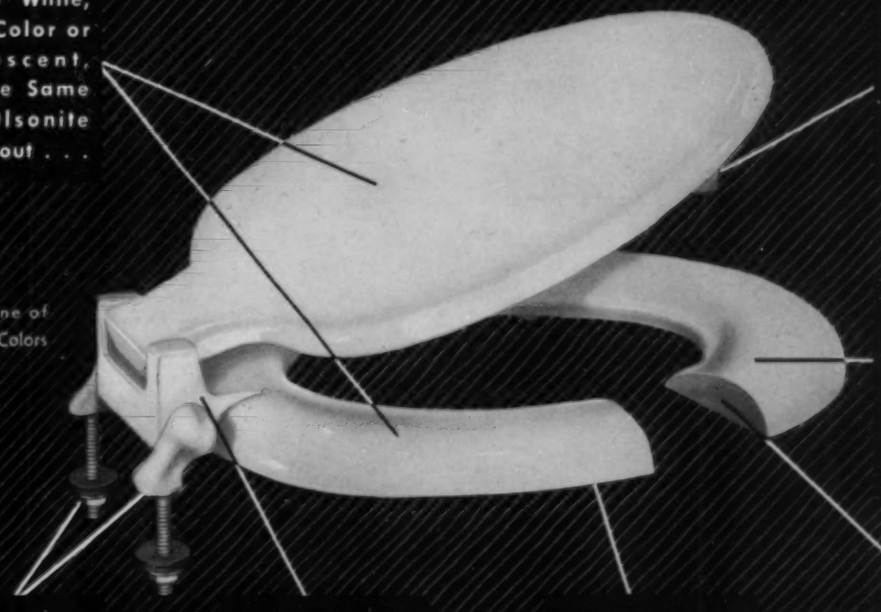

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or interstate agencies in obtaining approval of proposed projects from appropriate state water pollution bodies. Approval of the Public Health Service itself will have to be obtained as well as in all cases. FWA already holds authorization to then make grants for studies, surveys and other preliminary action preparatory to actual building. Loans for the planning and construction of sewage treatment facilities will bear two per cent interest in contrast to the interest-free loans formerly made by BCF to cities and states for planning all types of public works.

Grants for plan preparation for any one project cannot exceed $20,000 under the authorizing law, or one-third the cost of both planning and constructing, whichever is smaller. These loans will be made from the $22.5 million per year fund for five years.

In addition, smaller grants will be made for research and investigation on industrial waste disposal problems.

When the program is implemented with necessary funds from Congress, the Surgeon General of the U. S. will organize water pollution control activities on the basis of major river basins. Fourteen of these river basin offices will be established in respective watersheds; but the program will center in the Water Pollution Control Division of the Public Health Service.

A sum of $800,000 a year for five years will be spent on construction of a research and technical facility laboratory at Cincinnati, Ohio.

Government Reorganization Coming

Washington is waking up to a forthcoming reorganization of the Executive Branch to be proposed by the Hoover Commission right after the first of the year. The task force assigned to the job of going over the government construction agency ramifications reportedly has finished its preliminary report. This was written by Robert Moses, widely known New York planner. Heaviest rumor at present says this Moses report recommends cabinet status for a new Department of Public Works, gathering in all important construction activities of federal government, even housing.

But in any event, the reorganization plan has a long road to travel before the final decisions are made. When the Moses report is submitted to the Hoover Commission, it will be checked closely with other task force reports to eliminate overlap in the tentative rearrangement of Executive departments. The Commission itself will have to pass on final drafts before Mr. Hoover's report consolidating the task force efforts is finally prepared for Congress. (It goes to the Senate President and House Speaker within 12 days of the convening of Congress.)

It is doubtful any concrete results of the Hoover Commission's work will be evidenced in practice, in administrative changes, that is, before well into the fiscal year of 1950.

❖ ❖ ❖

ON THE CALENDAR

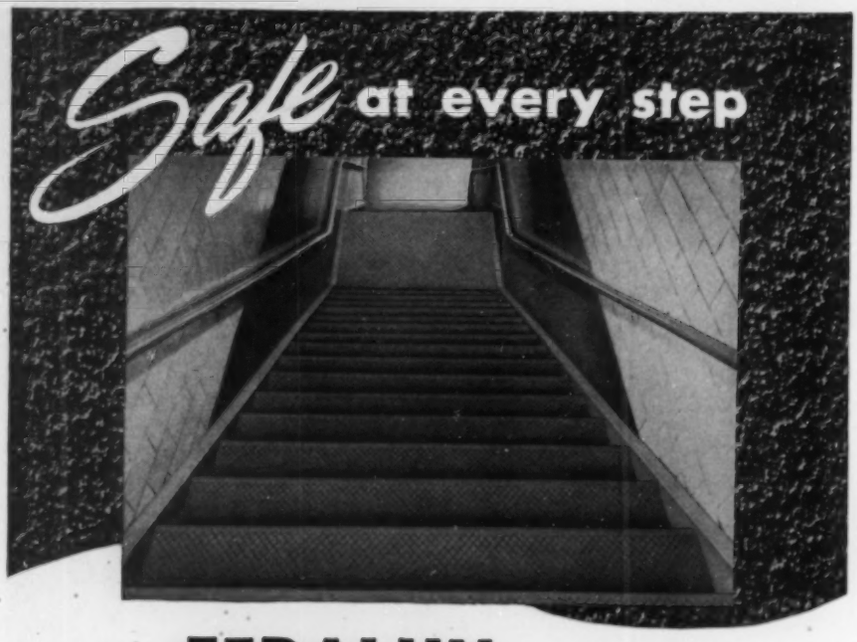
Nov. 14–20: 41st Annual Convention, National Association of Real Estate Boards, Hotel Commodore, New York City.

Nov. 15–17: Fall Meeting, American Oil Chemists' Society, Pennsylvania Hotel, New York City.

Nov. 29–Dec. 4: 18th National Exposition of Power and Mechanical Engineering, Grand Central Palace, New York City.

Jan. 10–14: 3rd National Materials

(*Continued on page 184*)



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Workmen at the Curtiss Wright Plant, Propeller Division, Caldwell, N. J., go up and down these stairs . . . safe at every step.

Their shoe soles come to grips with non-slip Feralun Safety Stair Treads, cast iron, with wear-resistant abrasive embedded right in the walking surface.

Heavy traffic day in, day out — — but Feralun Safety Treads, built to take hard use, stay non-slip . . . last and last.

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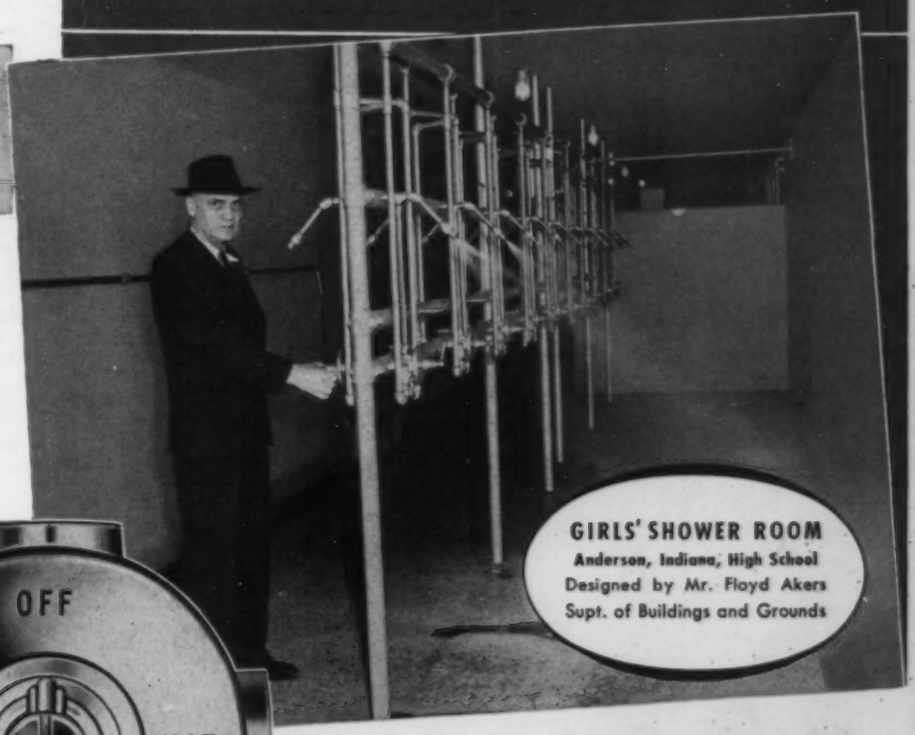
CAN YOU *Top This* ECONOMICAL 20 SHOWER LAYOUT?

TYPE H MIXER
For concealed piping
Dial diameter 6"



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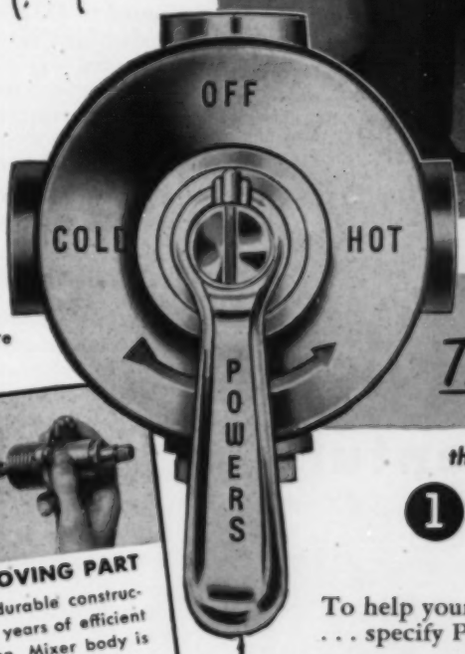
TYPE H Thermostatic MIXER
For exposed piping
Dial diameter 3¼"



CAPACITY
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More economical too. They speed up bathing. No hot or cold water is wasted while bathers wait for a shower at the right temperature. *(For a close-up photo showing the economical piping layout shown above phone or write our nearest office.)*

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CONSTRUCTION REPORT

Building and construction activity in the 37 states east of the Rocky Mountains, as measured by the dollar volume of contracts awarded, last month maintained a favorable 4 per cent gain over the corresponding month of last year, but F. W. Dodge Corporation statistics show a normal seasonal decline of 11 per cent from July.

A statistical summary of the Corporation's field reports totaled $854,091,000 in August building awards against $962,685,000 in July and $823,216,000 in August of last year in the area east of the Rockies.

While the 15 major reporting regions all showed cumulative gains during the first eight months of this year as compared with the corresponding period of last, there appeared for the first time in several months a perceptible tendency toward declines in New England, metropolitan New York and Northern New Jersey, the southeastern states and southern Michigan. These areas all showed declines from the dollar volume reported for July and also for August of last year.

As the eighth month of the year drew to a close, the field reports indicated that the dollar volume for the year to date stood at 32 per cent higher than for the corresponding period of last year. The cumulative total at the end of July was 38 per cent higher than that reported for the corresponding period of the previous year, and at the end of June it stood at 36 per cent.

Nonresidential awards in August in the 37 eastern states totaled $308,750,000 to show a decline of 22 per cent from July and a gain of 6 per cent over August of last year.

Residential awards last month amounted to $337,550,000, a decline of 3 per cent from July's total, and a gain of 9 per cent over August 1947.

Public works and utilities, including both public and private work, totaled $207,791,000 last month to reflect a 5 per cent drop from July's total and a decline of 7 per cent from the total shown for August last year.

1948 . . . sodium pentothal being injected into vein of chest case patient prior to operation

1847 . . . ether administered by a sponge soaked with the drug

Bettman Archive

NATIONAL COMMITTEE FORMED

The establishment of a National Joint Committee to study matters of mutual concern to engineers, general contractors, and the public with a view to more economic construction has been announced by the American Society of Civil Engineers and the Associated General Contractors of America. Earlier in the year, a similar national joint committee was established by the A.I.A. and the A.G.C.

The following have been discussed as subjects on which cooperative study by engineers and contractors can bring beneficial results:

1. Construction courses in engineering colleges to train men for construction.
2. Making work in construction and designing public works attractive to young engineers.
3. Standard contract clauses for engineering construction clearly understood by engineers and contractors.
4. Clear and definite specifications clearly understood by all parties.
5. Design which can obtain maximum benefits from mechanized construction operations.
6. Equitable and clearly understood bidding and awarding procedures for engineering construction.

(*Continued on page 186*)

Progress in Van's century

● As measured by medical science, the years 1847-1948 marked a century of almost fabulous progress. As the pioneer in the industry, progress in the science of kitchen engineering and the art of kitchen equipment manufacture has naturally been linked with the name of Van.

● Hospital administrators and their architects call Van early for suggestions when planning new projects, revisions or expansions.

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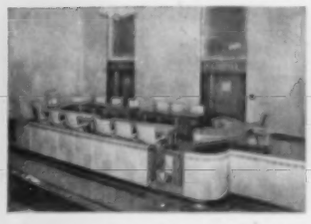
OFFICES. Birch Weldwood combined with wallpaper. Valance is decorative and practical — it conceals drape and blind attachments, and provides space for indirect lighting fixtures at the same time.

BARS & RESTAURANTS. This beautiful Claro Walnut Weldwood bar front was made for the Cardinal Richelieu Hotel, San Francisco. Walls and columns were covered with the same paneling.



INSTITUTIONS. Mengel Flush Doors and trim of Ribbon Grain Walnut Weldwood set off the diamond-matched bleached Walnut walls and railing. Recessed panels over doors are of Stump Claro Walnut.

HOTELS. Your first impression of the Ottaray Hotel lobby, Greenville, S. C., is one of richness and good taste. Guinea Wood Weldwood in a handsome treatment of walls, columns and stair-rail.

STORES. Window-dress the whole store! Graceful curves and smooth-flowing lines provide an eye catching background for display in this I. Miller shoe salon, New York. The wood is oak Weldwood.

BANKS. Dignity and stability are the keynotes of this luxurious installation of Figured Mahogany paneling in the Conference Room of the Long Island City Savings Bank, L. I. City, N. Y.

Most commercial installations present essentially the same requirements for an interior wall surface. Appearance, durability, ease of maintenance and finished cost . . . these are the major questions.

And here are Weldwood's answers:

APPEARANCE. Man's old-time, all-time structural-decorative favorite . . . wood. Choose from the very finest domestic and imported hardwoods . . . because only selected flitches go into Weldwood panels. Create traditional or modern interiors. You have a wide latitude for numerous effects . . . because Weldwood's lustrous beauty is a perfect complement to any style.

DURABILITY. Weldwood *resin-bonded* panels are laminated under heat and pressure, to produce a modern form of decorative panel that will *never* warp, crack or delaminate, when properly installed.

EASE OF MAINTENANCE. First cost is practically last cost, when Weldwood walls are installed. These beautiful decorative panels maintain their original beauty with minimum care. Maintenance is negligible.

FINISHED COST. Because Weldwood panels combine high structural strength with great decorative beauty, you can specify many short cuts that save both material and labor. Your finished costs will look good, compared to the striking appearance of the finished job.

So look into Weldwood for *all* your commercial clients. Take your choice from fine woods like oak, birch, korina, maple, walnut, gum, mahogany, zebrawood, avodire, rosewood and teak. Make *everybody* happy . . . store-owners, restaurants, bankers, businessmen, hotel-owners and operators of institutions. Specify Weldwood for their interior walls.

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Fourteen fellowships for mature students and artists capable of doing independent work in architecture, landscape architecture, musical composition, painting, sculpture, history of art, and classical studies have been announced by the American Academy in Rome.

These fellowships will be awarded on evidence of ability and achievement and are open to any citizen of the United States for one year beginning October 1, 1949, with a possibility of renewal. Each fellowship carries a stipend of $1250 a year, transportation from New York to Rome and back, studio space, residence at the Academy, and an additional travel allowance depending upon cost in Europe.

All applications must be received by February 1, 1949. Requests for details should be addressed to the Executive Secretary, American Academy in Rome, 101 Park Ave., New York 17, N. Y.

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Panel Type Compartments For Utility and Economy

For buildings in which toilet compartments must withstand rigorous service and where economy is a factor, Weisteel Panel Type is a wise specification. Their durability and long-run utility have been proved in 38 years of nation-wide use. Now,—bonderized, galvanized steel, finished in high-temperature baked synthetic enamel, assures practical freedom from rust, plus long years of extra value service. Where utmost utility per dollar of cost is important, you can depend on these well-designed, quality-built compartments.

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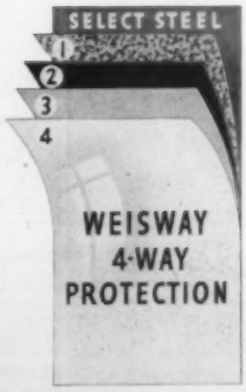

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AT THE COLLEGES

New Courses

A new evening course in the field of land subdivision, with particular reference to planning aspects, has been added to Columbia University's Planning and Housing Division curriculum for the winter session. The course is organized to serve both subdividers and developers of land as well as the governmental agencies in the New York area which generally deal with new land developments. It will consist of 15 sessions, and will include discussions on the techniques and procedures of local planning under the laws and practices of New York, New Jersey and Connecticut, and on the principles of good subdivision design and improvement. Director is Hugh R. Pomeroy, director of the Westchester County Department of Planning.

Columbia University is offering more than 50 evening courses in architecture and related subjects and six advanced day courses, leading to the degree of Bachelor of Architecture, during the current academic year. The courses will cover design, construction, history, planning and housing, and theory. The evening curriculum for high school graduates consists of at least 30 points of pre-architectural subjects, six years of evening attendance in professional courses, and one year of full-time attendance in the School of Architecture.

A new course in public housing is offered this year in the Public Service Training Program of the Evening and Extension Division, City College School of Business. It will be taught by James H. England, executive director of the New York City Housing Authority, and will cover the need for public housing in the United States and the problems to be faced in carrying out government housing, with emphasis on the public housing programs of New York City, New York State, and the federal government.

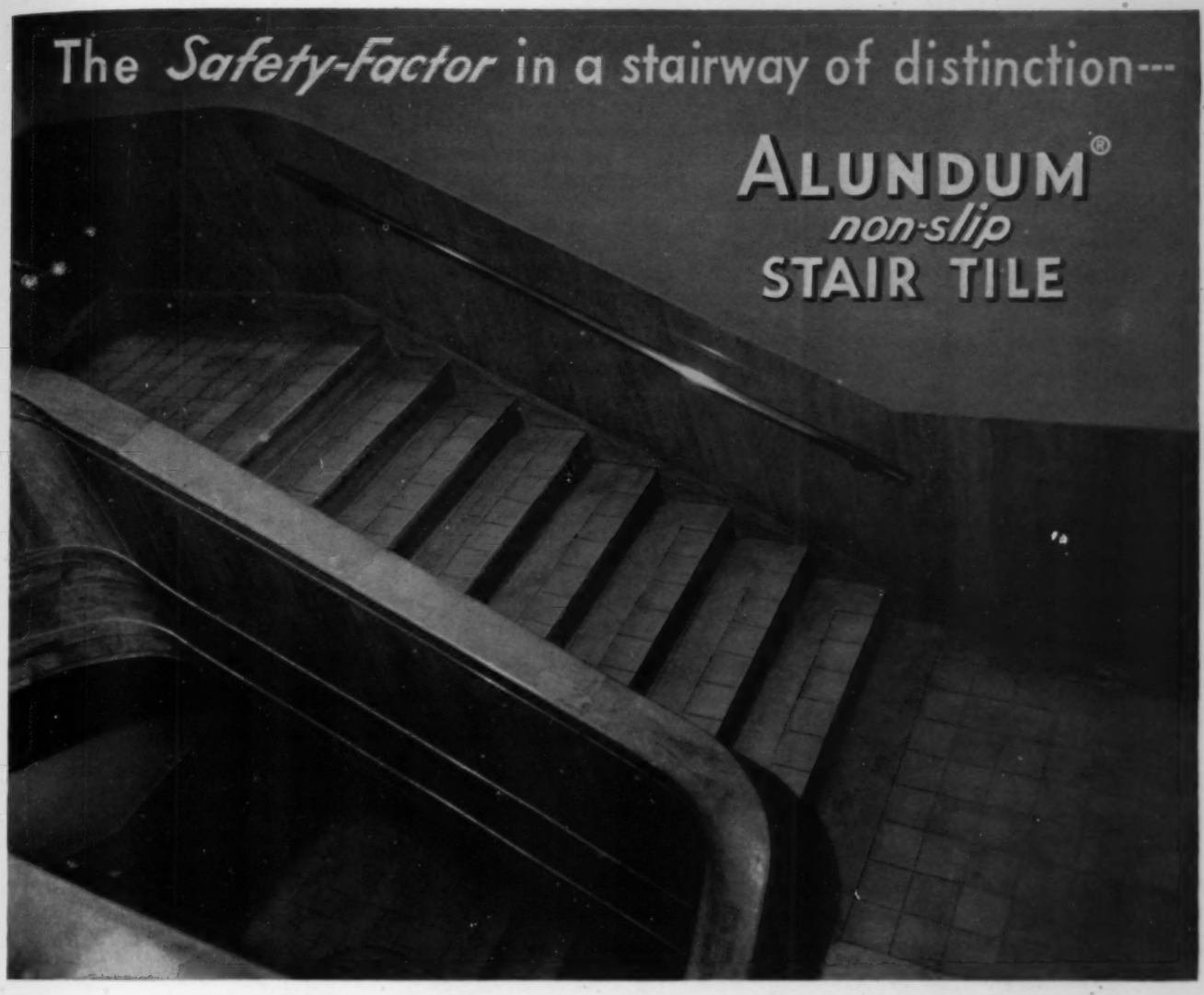
New School Organized

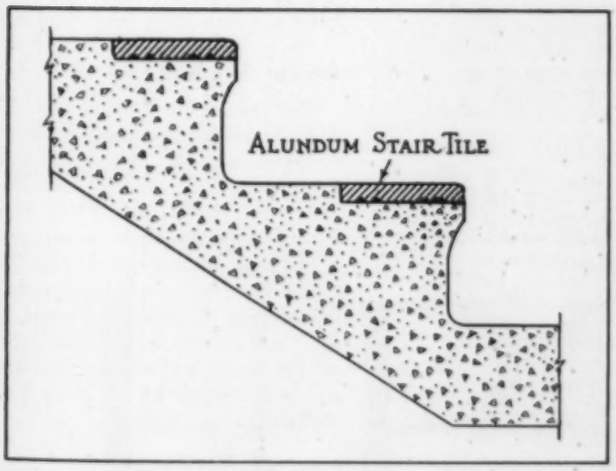
North Carolina State College of the University of North Carolina at Raleigh has announced the formation of a School of Design with Henry L. Kamphoefner, formerly professor of architecture at the University of Oklahoma, as its first dean.

Two departments are now a part of the new school. The Department of Landscape Architecture has Edwin G. Thurlow as head, and Professors Lawrence B. Enersen and Morley J. Williams begin their second year with the College and their first in the new school.

The Department of Architecture, formerly in the School of Engineering, is being reorganized with Matthew Nowicki, Poland's representative on the 15-man Board of Design for the United Nations center in New York, as Professor

(*Continued on page 188*)





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[*See our Catalog in Sweets*]

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of Architecture and acting head. New associate professors are James W. Fitzgibbon, Edward W. Waugh and Duncan Stuart. Other members of the faculty are assistant professor George Matsumoto, visiting assistant professor (part time) Stanislava Nowicki, instructors John C. Knight and John H. Moehlman, Instructor (part time) Margaret Crosby Fitzgibbon and Graduate Assistant David George.

Lewis Mumford will be a member of the new staff as Visiting Professor of Architecture and will spend six 10-day periods on the Raleigh campus where he will give a series of public lectures and seminars with the advanced students in architecture and planning. He also will lecture at the University in Chapel Hill as a part of the program in the Graduate Department of the City and Regional Planning.

Plans are now being projected to include work in the near future in textile, industrial, ceramic and furniture design in collaboration with the schools and departments already in the College where the present work in those fields is concerned mainly with production and management. The new School of Design will coordinate those activities with the new facilities and faculties in design.

Professor Ross Shumaker, Associate Professor William L. Baumgarten and Assistant Professor Alexander Crane, who were members of the Department of Architecture before the reorganization, will continue in the new school. F. Carter Williams returns to the staff as visiting Associate Professor (part time) for the Fall term.

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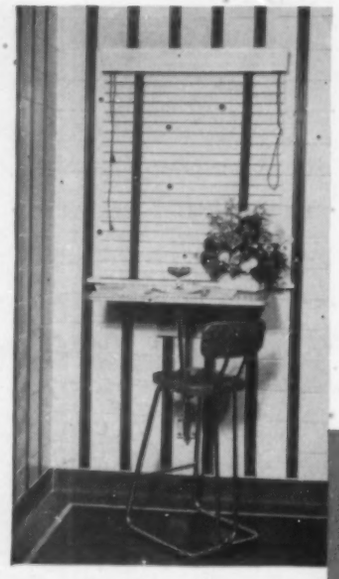
When you specify Alumitile you give your client assurance of enduring beauty, *and* the convenience of gleaming, easy-to-clean walls at prices within the most modest budget. You, the architect, are assured of quality, permanence, and dependability with this modern wall covering. Alumitile is made of sturdy aircraft aluminum, so light in weight that it presents no structural problem. Finished in a choice of 14 decorator selected colors, baked on for permanence, Alumitile offers a wide range of distinctive designs. When applied with a waterproof mastic to any smooth surface it becomes as rigid as the wall itself. Alumitile is thoroughly proof against fire, water, rust, heat and cold. It will not crack, peel or craze. Alumitile is the ideal wall covering for kitchens, breakfast nooks, laundries and bathrooms for home use; and in addition, it has a wide range of commercial uses . . . both indoors and out. Investigate this amazing new wall tile—*alumitile*. Send coupon for descriptive material, color chart and FREE sample.



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Appointments

Louis I. Kahn of Philadelphia and Eliot F. Noyes of New Canaan, Conn., both well-known architects, have been appointed to the Yale University faculty as Critics in Architectural Design. Appointed Visiting Critics at Yale, to supervise problems in Advanced Architectural Design for a five-week period each, are: Sven Markelius, noted Swedish architect and member of the UN Architectural Commission; Eero Saarinen, graduate of the Yale Department of Architecture and winner of the Jefferson Memorial Award a few months ago; Pietro Belluschi, architect of Portland, Ore.; John Sloan of New York, who has specialized in the office, hotel and public building fields; and Hugh Stubbins of Lexington, Mass., Associate Professor of Architectural Design in the Graduate School of Design at Harvard.

Three new instructors have been added to the architectural faculty of The Cooper Union Art School, New York City: Carl Frederick Brauer and Sam J. Glaberson, both in private architectural practice in New York, and Peter W. Bruder, a New York consulting engineer.

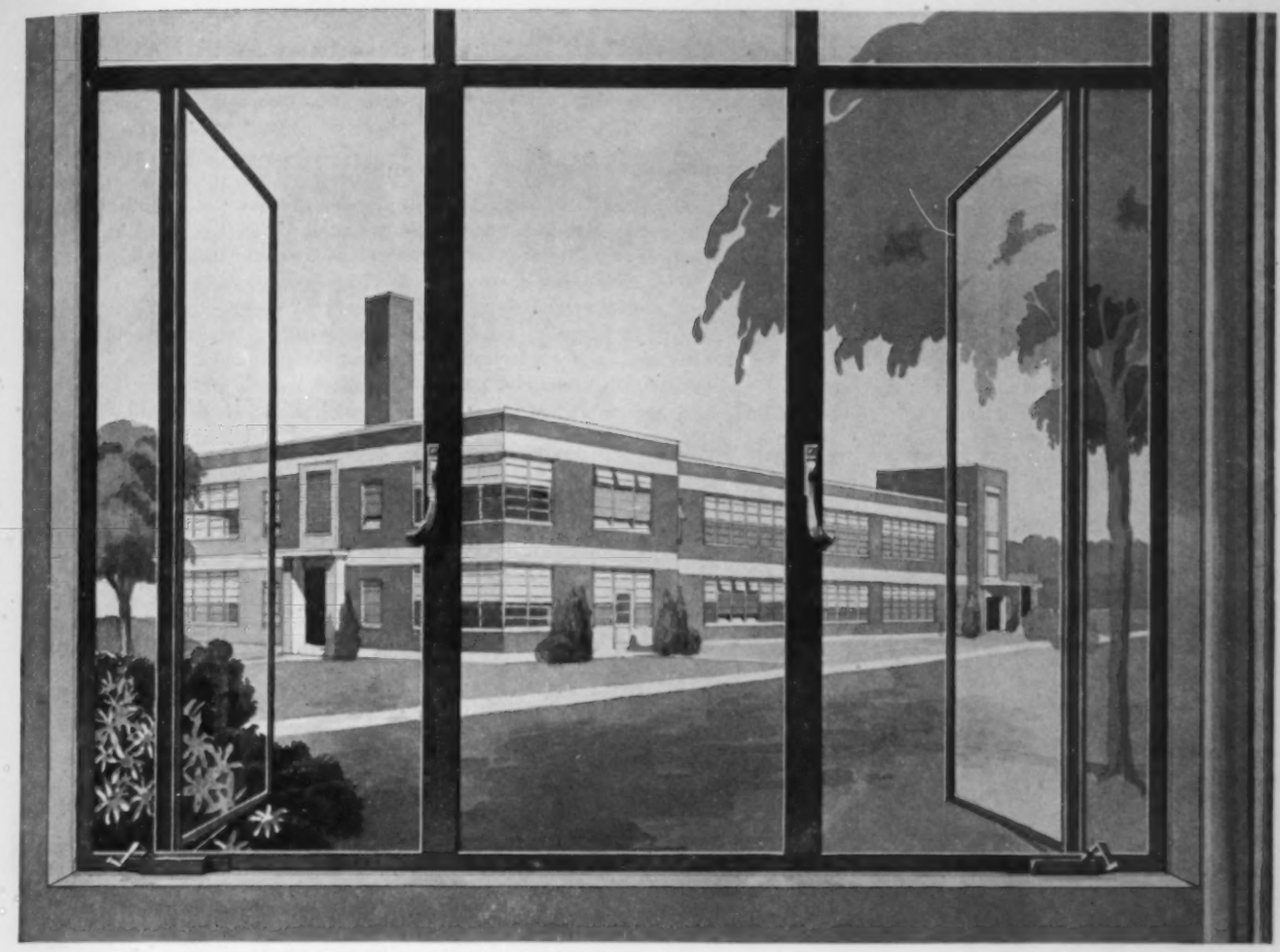
Award Announced

The Trustees of The James F. Lincoln Arc Welding Foundation have announced a joint award of $5000 to Professors C. D. Williams of the University of Florida and E. C. Harris of Fenn College for their co-authorship of a textbook manuscript in the Foundation's Textbook Award program. Their manuscript, "Structural Design in Metals," was chosen as the best submitted in the structural engineering field. It will be published by the Irwin-Farnham Publishing Co., Chicago.

New Booklet Issued

Let's Build A House!, the latest 12-page research bulletin issued by the Louisiana State University Engineering Experiment Station, outlines economical building methods and designs for small houses, with maximum comfort and

(*Continued on page 190*)



George Harris Richardson Elementary School, Washington, D. C. Architect: M. A. Coe, Municipal Architect, District of Columbia. Builder: J. D. Hedin Construction Co., Washington, D. C. Viewed through Lupton Casement Window. School windows are Lupton Architectural Projected-Type.

See what modern metal windows can mean in school building. Bright, cheerful classrooms with large window areas . . . abundant, non-glare daylighting with clear, effortless vision in every part of the room . . . all of these advantages are available with Lupton Windows. Lupton Metal Windows provide controlled, natural ventilation. Beautifully designed operating hardware adds the modern look to classroom interiors. Economy, a vital feature of large scale building, is effected by the long life of Lupton Metal Windows. Bronze wire screens with neat, narrow metal frames can be furnished with open-in or open-out ventilators. There is a Lupton Metal Window for every type of building. Write for our catalog or see it in Sweet's.

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LUPTON
METAL WINDOWS

livability, in view of the present level of building costs. It includes illustrations, check lists and discussions on financing, employing the architect and contractor, and long-range considerations of the site, design, plan and equipment, emphasizing storage facilities. Copies of the bulletin or additional information can be obtained free of charge from Low-Cost Housing Research, Engineering Experiment Station, Louisiana State University, Baton Rouge 3.

OFFICE NOTES

Offices Opened, Reopened

Boddy-Benjamin Associates, Inc., Architects and Engineers, have announced the opening of offices at 2210 Park Ave., Detroit, Mich. With architectural, structural, mechanical and electrical departments, the firm is prepared to render complete architectural and engineering services on industrial, commercial and public buildings, and on industrial and public utility power plants. Principals in the new firm are Fred A. Boddy and Max W. Benjamin, Registered Mechanical Engineers, and Frederick H. Potz, A.I.A., Registered Architect.

Charles E. Boettcher has opened an office for the practice of architecture at 420 Cutler Bldg., Rockford, Ill. He will specialize in commercial, residential, and interior design.

Henry V. Chescoe, Architect, has announced the opening of an office at 909 Hearst Bldg., San Francisco, Calif.

Robert Wehrli, Architect, has opened a branch office at Worland, Wyo., for Goodrich & Wilking, Associated Architects, of Casper, Wyo.

New Addresses

The following new addresses have been announced:

Barber & McMurry, Architects, 2375 Kingston Pike, Knoxville, Tenn.

Marcel Breuer, Architect, 113 E. 37th St., New York 16, N. Y.

Richard Hawley Cutting and Anthony S. Ciresi, Architects, 2074 E. 36th St., Cleveland 15, Ohio.

Gardner A. Dailey, F.A.I.A., and Associates, Architects, 442 Post St., San Francisco 8, Calif.

Oswald Fischer, Architect, 35-10 Broadway, Long Island City 3, N. Y.

Robert Heller, Inc. (formerly Robert Heller Associates), Industrial Designers, 161 E. 61st St., New York 22, N. Y.

J. MacDonald Jacob & Assoc., A.I.A., 217 Pierce St., Birmingham, Mich.

New York City Housing Authority, 63 Park Row, New York City.

Arthur Rigolo, A.I.A., Route 6 at Grove St., Clifton, N. J.

New Firms, Firm Changes

Announcement has been made of the combining of offices of Carson-Kantianis-Kirley, Architects, Springfield National Bank Bldg., Springfield, Mass.

Churchill-Fulmer Associates, Architects and City Planners, of New York City, are entering the field of school planning and school surveys, with Ralph S. Foss in charge of the educational side of the work.

Theodore Hartman, Architect, has announced his severance from the partnership of Howe and Hartman and the opening of his own office for the general practice of architecture in the Goetz Theater Bldg., Monroe, Wis.

Alfred A. Rothmann, Architect, has become associated with the firm of Alfred Hopkins & Associates — Architects, of 415 Lexington Ave., New York City. Mr. Rothmann was formerly chief architect of the eastern district of the Austin Company.

Charles J. Wornfeld and Eric Singleton have resigned from the engineering firm of Gibbs & Cox to open their own consulting engineering offices at 150 Nassau St., New York City.

THE MEASURE OF YOUR REPUTATION

A house is often judged by its roof . . . and the measure of your reputation is the roof you build.

Better roofs are built with Bird Master-Bilt Thick Butt Shingles. Tests *prove* they're better . . . and the biggest test is time. The *extra* layers of asphalt and deeply embedded mineral granules give a tougher weatherproof surface, and added fire resistance for long life of the shingle. Narrower cut-outs and heavier shadow lines give a massive appearance to the roof. Bird Master-Bilt Thick Butt Asphalt Shingles are available in a wide range of handsome colors and blendes . . . *more variety than is found in any other type of roofing material* . . . there's a color perfect for every roof.

Test Bird Master-Bilts yourself—compare them. They are worthy of your best building design . . . the measure of your reputation.

In-wall condensation ruins many fine buildings. Guard against it . . . use Bird Neponset Black Vapor Barrier. On the warm side of insulation, it costs about $20 for a $10,000 house . . . an investment that pays. Ask about it today.

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NEW YORK SHREVEPORT, LA. CHICAGO

"Definitely a Source of Fuel Economy"

... a PETRO, of course!

WHEN AN ARCHITECT specifies a Petro oil burning system, he knows he can count on dependable heating performance. Either from his own experience or that of others, he realizes a Petro means steady, reliable operation year after year, unshackled by bothersome upkeep or costly maintenance.

Also, a Petro is "definitely a source of fuel economy". Incorporating such oil-conserving features as the Petro Thermal Viscosity Control, Petro industrial units have the capacity to burn the heavier, lower-cost, higher-heat fuel oils at peak combustion efficiency. Petro domestic equipment is noted for "tubular atomization", a hollow cone of atomized oil spray that ignites instantly, burns cleanly.

These features contribute to fuel savings. They make for owner satisfaction and appreciation which redound to the architect's credit. Mr. Burrows succinctly sums it all up with the expression "Petro performs beautifully". To which we would add — in any building, small or large.

INDUSTRIAL MODELS: No. 5 or No. 6 fuel oil; manual, semi-automatic or automatic operation; 8 sizes to 450 bhp. Thermal Viscosity preheating.

DOMESTIC MODELS: No. 3 or lighter oils; "conversion" and combination-unit types, 7 sizes. Patented "Tubular Atomization."

FULL DATA on Petro Industrial Burners are in catalog files of Sweet's and Domestic Engineering. Details on Petro Domestic Burners available in separate catalog. Copy of either sent gladly on request.

John S. Burrows, Jr., nationally known architect, author of the book, "Your New Home, 1948"; Chairman Small House Committee, A.I.A., for the City of New York; member of the committee of the New York Chapter, A.I.A., to study the problem of housing for paraplegic veterans. Mr. Burrows makes these comments concerning oil heating:

"I have found that more and more owners are switching to oil heat, particularly on a price basis.

"In regard to Petro equipment, it performs beautifully in the jobs where I have used it. It is thoroughly reliable and is definitely a source of fuel economy. The Petro distributor is a big help to his clients for he retains their confidence and is a constant source of service".

PETRO
REG. U.S. PAT. OFF.
cuts steam costs

PETROLEUM HEAT AND POWER CO. • ***Makers of Good Oil Burning Equipment Since 1903*** • ***Stamford, Connecticut***

(*Continued from page 153*)

dependent of the heater elements in the summer. Edwin L. Wiegand Co., 7500 Thomas Blvd., Pittsburgh 8, Pa.

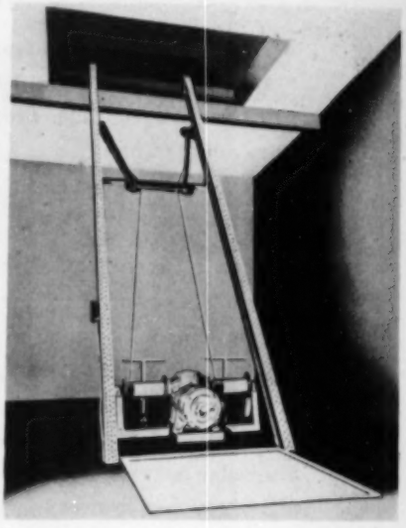
AIR REGULATOR

A new control device called RAC (Regulated Air Circulation) has been designed to eliminate sudden blasts of cold or hot air often associated with warm air heating systems by automatically regulating the volume of cold air intake in direct proportion to the temperature of warmed air ready for distribution.

The RAC Control is activated by a sensitive metal cylinder installed in the warm air plenum and connected to a damper in the cold air return by a capillary tube containing a special fluid. In this way, the manufacturers explain, the degree of heat in the plenum controls the supply of cold air fed into the heating system in pre-determined amounts, established by the adjustment of a simple dial. No electrical or other connections are necessary, and the device may be installed on old or new forced warm air heating equipment. Jones & Brown, Inc., 439 Sixth Ave., Pittsburgh, Pa.

STAIRWAY LIFT

An automatic, motorized stairway lift for floor to floor material handling has recently been introduced for use in any open space either inside or outside the building or over a present wood or concrete stairway.



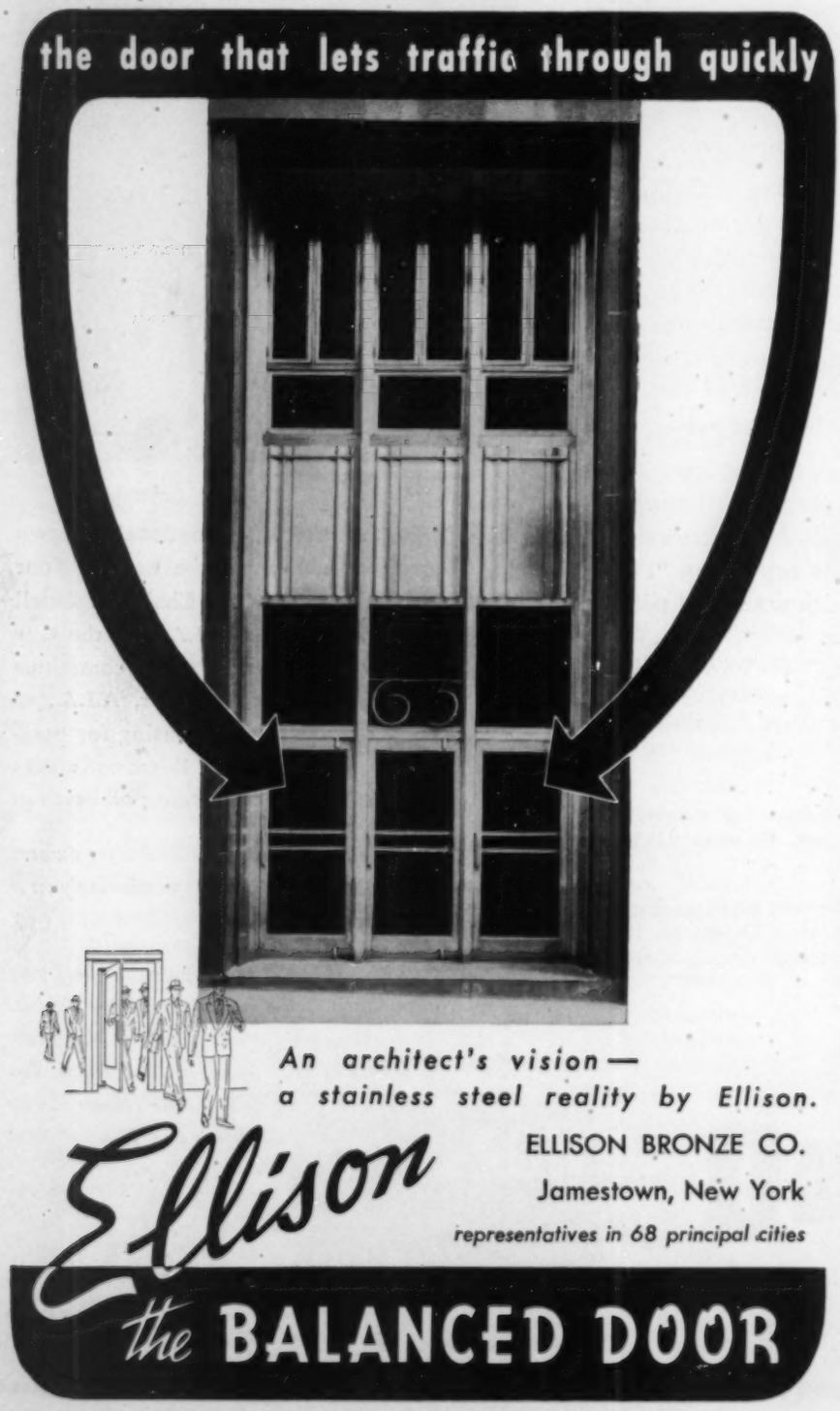
Stairlevayor, a motorized lift designed for use in open spaces or over stairways

Stairlevayor is adjustable for width, length and pitch of stairway; is said to require no special shaft space or reinforcement, and is designed to be erected either with a small wedge-shaped recess at the stairway base or in conjunction with a short ramp. It features push-button controls at every floor level, and is said to have a safety factor of over five to one. The lift comes complete with motor, cables, automatic limit switch and electric brakes and is available with or without steel stair treads. The manufacturer states that the Stairlevayor can be installed by any contractor in less than a day's time. The Moto-Flow Co., 141 A Webster St., Bay City, Mich.

LIGHT METERS

Three new instruments for measuring light intensities have been developed to make possible more accurate measurement of illumination "in the field." Errors in the old-type light and exposure meters, which require the interpretation

(*Continued on page 194*)



K&M "Century" Asbestos Corrugated

for long life without maintenance...

The "new" roof on this industrial building is actually more than 3 decades old! A coal operator installed these "Century" Asbestos Corrugated sheets on a coal tipple 33 years ago before he re-used them here.

for modern architectural effect...

Beauty in typically modern style is brought to this store with a facade of "Century" Asbestos Corrugated. This beauty will *last* without any painting or other expensive upkeep.

You've probably noticed that "Century" Asbestos Corrugated is growing in popularity for decorative motifs... inside and outside... for industrial plants, stores, restaurants, theaters. There's a rugged attractiveness in the simplicity of the corrugations and neutral light-gray coloring.

And perhaps it's no news to you that "Century" Asbestos Corrugated is thoroughly practical from the *structural* point of view. It actually *toughens* with age. Never needs to be painted. Can't rot, corrode, catch fire, or succumb to termites.

NEW "TOP-SIDE" FASTENERS CUT ROOFING COSTS

On top of all this, you can specify the new "TOP-SIDE" Fasteners, and cut a big slice off the cost of roof installation over steel purlin construction. Exclusive with "Century" Asbestos Corrugated, these new fasteners permit roofing to be done entirely from *atop the roof* ... eliminating entirely the costly labor and scaffolding normally required beneath. This feature, alone, is worth looking into—write us for full details.

Original manufacturers of asbestos-cement shingles in this country

DIAMOND ANNIVERSARY 1873 1948 KEASBEY & MATTISON CO.

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ARCHITECTURAL ENGINEERING

TECHNICAL NEWS AND RESEARCH

(*Continued from page 192*)

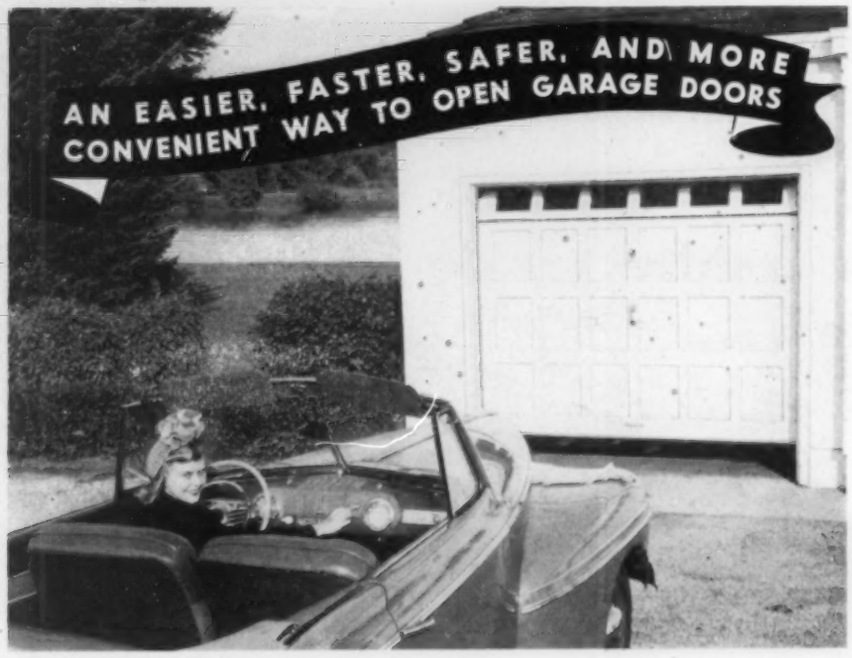
of their readings by lighting experts, were said to have been caused by the color of light (the cells in light meters being more responsive than the human eye to blue and ultraviolet wavelengths of energy) and the reflection of light (especially when the light strikes at an angle from the surface of the cell and its protective glass cover plate).

The technique for correcting the errors caused by color and reflection is described as consisting of the cementing of proper lenses and, in some cases filters, to the cells themselves.

The smallest of these new instruments is a pocket-size light meter using one of the laminated cells and is said to be within 10 per cent accurate for any color of light or angle of light incidence.

A larger, more sensitive instrument, the *Low-Range Precision Light Meter*, features the mounting of the cell in a gimbal, similar to those used in naval gyro compasses, to eliminate the need for hand leveling and increase the speed of taking readings. Its angular response is described as "almost perfect" and is said to be 100 times more sensitive than the pocket meter.

Designed to incorporate both color and angular precision through the use of laminated cells is the *Multi-Range Precision Light Meter* having 10 times the sensitivity of the pocket meter. General Electric, Lamp Dept., Nela Park, Cleveland 12, Ohio.



Use the time-proved, dependable Barber-Colman RADIO CONTROL

We designed, built, and installed RADIO CONTROL for garage doors in 1926 — over 20 years ago! Between then and 1936 we redesigned the units several times, simplifying the equipment and improving its dependability of operation. For over 10 years now (except during the war period) we have been offering a successful system which has proved its reliability in thousands of satisfactory installations.

With the Barber-Colman RADIO CONTROL for garage doors, the driver has only to touch a button on the instrument panel of the car as it approaches the garage. The door immediately opens and, if so arranged, lights in the garage and along the driveway are automatically turned on. When the door is open, it can also be closed by the RADIO CONTROL or, if preferred, from a wall switch in the garage or the house. *RADIO CONTROL eliminates all need for getting out of the car to open or close the garage doors!* Consult your nearest BARBER-COLMAN representative for details of equipment and installation.

FOR FURTHER INFORMATION SEE OUR CATALOG IN SWEET'S

Write for current literature

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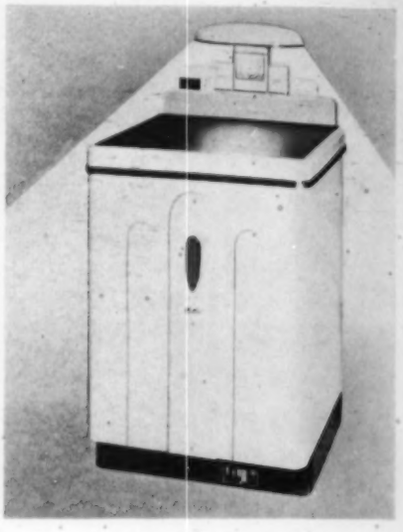
BARBER-COLMAN COMPANY
102 MILL ST. • ROCKFORD, ILLINOIS



Water heater features linoleum desk top

DESK MODEL WATER HEATER

The Bradford Kitchen Desk Water Heater combines an electric water heater unit and a kitchen-secretary unit, complete with linoleum desk top, desk lamp, note pads, pencils, minute minder clock and condiment set. The heater, measuring a scant 25 by 25 by 36 in. is available in both 30 and 50 gal. models. The manufacturer describes the heater as featuring electric arc-welded, copper bearing steel tanks, galvanized and hydro-statically pressure-tested to 353 lb.; Fiberglas insulation; and adjustable thermostats. Pennsylvania Range Boiler Co., 24th and Ellsworth Sts., Philadelphia 46, Pa.

STEEL SHORE

Recently introduced in this country is a new type, steel, adjustable shoring device which, the manufacturers report, can be erected to any working range by one workman in three simple movements. These consist of lifting an inner tube, inserting a pin in the nearest hole which acts as a safety lock, and turning the handle for final adjustment. The shore is made in four heights ranging from 5 ft. 7 in. to 11 ft. and is adjustable up to 15 ft. when fully extended.

In addition to its use in supporting temporary formwork to concrete floor arches, beams, walls, columns, etc., it

(*Continued on page 196*)

Only THRUSH FLOW CONTROL VALVES Have This

PATENTED VENT BELOW SEAT

Hundreds of thousands of these valves now in use are giving trouble-free service.

Eliminates Leakage

THE PATENTED vent which relieves pressure **below the seat** in a Thrush Flow Control Valve is only one of the features which make this valve outstanding. It has no tight fitting guides. There is nothing to bind or stick. Shut-off is positive. It is easy to install . . . and eliminates the need for a union. The convenient manual adjustment does not interfere with normal operation. With all its important advantages, the Thrush Flow Control Valve costs less than competitive valves. It is used with a Thrush Water Circulator to control circulation and prevents wasteful overheating in automatic Forced Circulating Hot Water Heating Systems. See our catalog in Sweet's or write Department J-11.

THRUSH WATER CIRCULATOR

H. A. THRUSH & COMPANY • PERU, INDIANA

FORCED CIRCULATING

Summer-Winter Hot Water Heat

(*Continued from page 194*)

can be adapted to scaffolding and sway bracing. Acrow Inc., 155 Washington St., Newark, N. J.

STRUCTURAL GLASS

A new shade of structural glass known as *Alamo Tan* has gone into production by Libbey-Owens-Ford Glass Company to replace *Ivory Vitrolite* which no longer can be made because of the ban on the use of uranium. The new shade will be available in both fire polished and mechanically polished surfaces. Libbey-Owens-Ford Glass Co., Nicholas Blvd., Toledo 3, Ohio.

DISHWASHER

The new model of the immersion-type *Dish-Master*, which can be used as a restaurant scullery sink as well as a dishwasher, features (1) an electrically fused, stainless steel body designed to attain smooth, seamless and leakproof connections; (2) a completely enclosed motor shaft for the ¼ hp motor, which agitates 315 gallons of water a minute, for protection against dust and moisture; (3) removable temperature-controlling thermostats to facilitate repairs; and (4) self-draining tank floors to permit water to run off automatically when the drain is opened and to increase the speed of the washing cycle. Liberty Metal Products Co., Inc., 65 Northampton St., Boston, Mass.

Scullery sink, washer are in same unit

OUTLET STRIPS

By providing a spread of electrical outlets at either 6 or 18 in. intervals along the baseboard or chair-rail molding of offices, a new *Plug-In Strip* is designed to provide sufficient outlets to "plug-in" business machines and desk lamps, to reduce fire hazards, and to eliminate the need for trailing extension cords.

A Plug-In Strip installation is made by joining either 3 ft. or 6 ft. standard lengths. The 24 gage steel channel and two copper wire conductors, "factory-wired" inside the raceway, may be cut to fit on the job with a hacksaw at any desired location between the receptacles. When these lengths are joined in an installation, a copper barrel connector is crimped over the conductor ends. This provides a solid copper conductor from panel box to last outlet and eliminates soldered and screwed connections in the circuit.

Matching fittings included are interior, exterior and flat elbows; center and end feeds; and "fill-in" strips for placement in inaccessible places such as behind radiators. A rounded trim, in itself a raceway for bell, buzzer or signal wiring, can be installed against the strip in order to provide a chair-rail molding, baseboard capping or conventional quarter round utility. National Electric Products Corp., Chamber of Commerce Bldg., Pittsburgh 19, Pa.

PLASTIC SPRAY

A new plastic spray, *Krylon*, is said to adhere to practically any material, dry in less than a minute, and leave a clear,

(*Continued on page 198*)

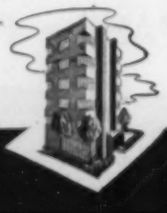
Edward S. Harkness Memorial Hall, Presbyterian Hospital, Columbia-Presbyterian Medical Center, N.Y.C.
Architects: Voorhees, Walker Foley & Smith. Builders: Vermilya-Brown Co., Inc.

183 Murphy-Cabranette Kitchens

Erected in 1947 as a dwelling-place for hospital personnel, this building is a model of modern apartment design.

Murphy-Cabranette Kitchens give complete kitchen facilities in minimum space. In each compact unit are combined modern range (gas or electric) with heat control and insulated oven, refrigerator with push-button door and stainless steel frozen food compartment, deep-bowl sink and storage space. Sink-and-range top are combined in one piece. All exposed surfaces are of genuine vitreous porcelain, easy to clean and never require repainting.

Murphy-Cabranette Kitchens are recommended for buildings which seek to save space, to provide modern convenience with trouble-free operation and neglible maintenance cost.



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Dept. R11 - MICHIGAN CITY, INDIANA

YOU'RE BETTING ON A SURE THING

WHEN FRINK PLANS YOUR LIGHTING

You *can't miss* when you take this sensible, *sure* approach to a properly planned fluorescent installation. Call in Frink. Ask for a ***PLAN-O-LITE***, a custom-designed lighting layout, engineered to meet all of your exact requirements. *You pay nothing extra* for Frink's helpful ***PLAN-O-LITE*** service, and it's a sure bet that you'll get a more efficient, better looking, more satisfying installation. Write today for the new ***PLAN-O-LITE*** sample packet offered below.

There's a Frink L-I-N-O-L-I-T-E fixture expertly engineered for every commercial fluorescent lighting need. Fifteen standard designs of highest quality workmanship and materials. Write for catalog.

See how it's done . . . the new Frink PLAN-O-LITE sample packet forcefully demonstrates the how, why and wherefor of engineered fluorescent lighting. It gives you eight PLAN-O-LITE layouts and engineering data for typical Frink installations, with photos of the outstanding results. FREE for the asking while the supply lasts. Write today to Dept. 11-AR.

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Designers and Manufacturers of

L-I-N-O-L-I-T-E

FLUORESCENT FIXTURES

(*Continued from page 196*)

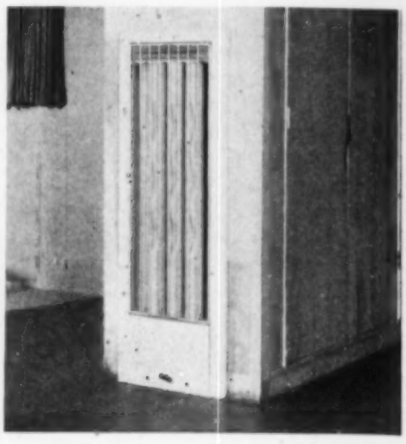
flexible coating with resistance to discoloration at high temperatures, water, alcohol, alkalis, acids, mineral oils, grease and chemical fumes. Krylon is distributed in a container with a press-button sprayer for easy application. Of particular interest to architects and engineers, Krylon is reported to be a valuable protective covering for drawings, tracings, prints, photographs, etc. Soap and water will remove dirt and smudges from the coated surface; however, if desired, the entire coating can be removed with a special solvent. Foster & Kester Co., Inc., Philadelphia 32, Pa.

LOCKER UNITS

The Office Valet-Lockerette provides an open type coat rack with spaced coat hangers, individually ventilated hat shelves, 12 by 12 by 15 in. lock boxes and an off-the-floor shelf for rubbers. The lock box sections are furnished assembled. The hat and shoe shelves slip into place between locker sections.

While ample space is claimed allotted to each employee, these units are said to save in floor space and can be spotted near points of work.

The Lockerette is available in capacities for 12 or 18 persons. The small size is 6 ft. wide by 15 in. deep by 6 ft. 6 in. high, while the large size has an additional width of 3 ft. These steel units are available in olive green, walnut brown and gray baked-on finishes. Vogel-Peterson Co., 624 S. Michigan Ave., Chicago 5, Ill.



Heater uses special flue for high output

GAS RADIANT HEATER

The *Panelray* gas heater employs a special flue, incorporating a series of convolutions, in order to obtain high heat output. This flue forms a vertical "heat trap", body height, which is designed to radiate heat into the living zone of the room.

The heater is designed for installation in standard 4 in. walls, and extends 1½ in. beyond the plaster. Panelray has no exposed flame or incandescent parts. Available sizes are 10,000, 20,000 and 30,000 Btu. input.

This heater was pictured on page 113 of the September issue and was designated improperly as to the source of radiant heat. Day & Night Mfg. Co., Monrovia, Calif.

BATHROOM CABINETS

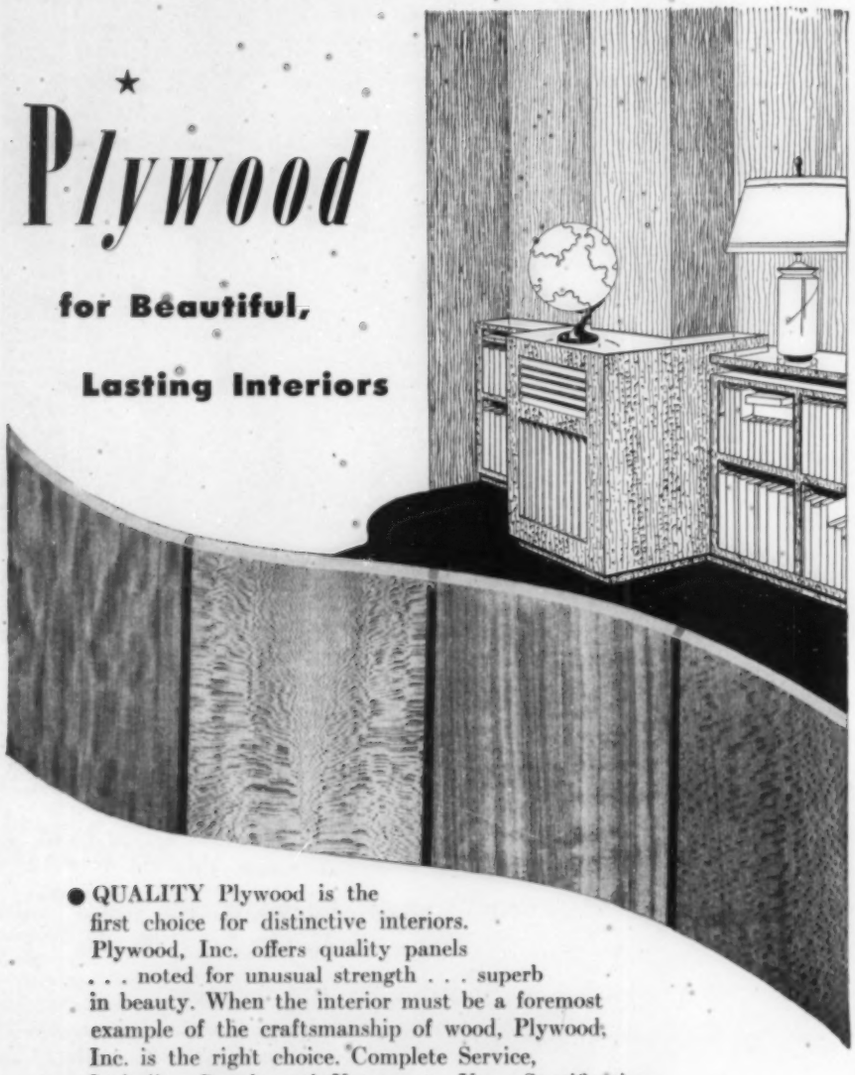
Philip Carey Mfg. Company is now equipping bathroom cabinets, of several styles and mirror designs, with fluorescent light fixtures. Features included are a single electrical outlet box that serves fixtures, switch and convenience plug and a simple nut-bolt to hold the bulbs and to facilitate changing them. Philip Carey Mfg. Co., Cincinnati 15, Ohio.

ILLUMINATED PICTURES

Utilizing the unusual ability of acrylic plastic to transmit light, illuminated pictures have been produced to provide

(*Continued on page 200*)

★ Plywood
for Beautiful,
Lasting Interiors



● QUALITY Plywood is the first choice for distinctive interiors. Plywood, Inc. offers quality panels . . . noted for unusual strength . . . superb in beauty. When the interior must be a foremost example of the craftsmanship of wood, Plywood, Inc. is the right choice. Complete Service, Including Panels and Veneers to Your Specifications.

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Write to Your Nearest Divisional Branch For Complete Facts

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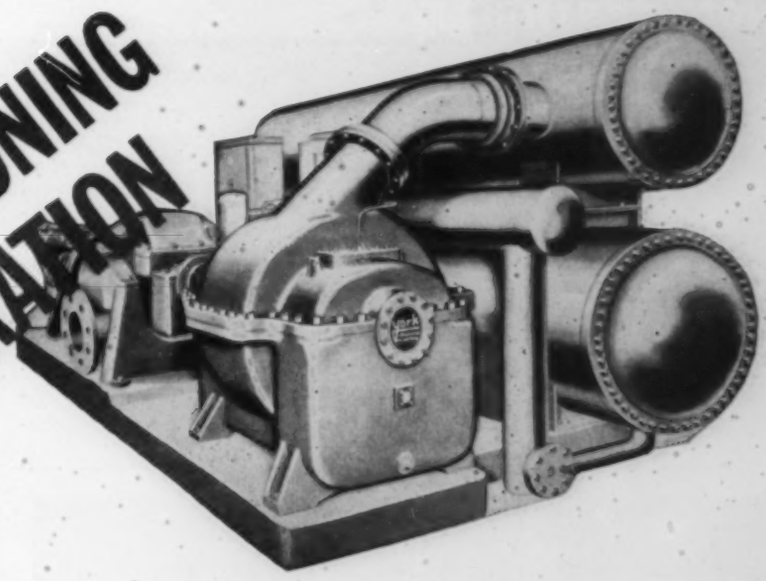
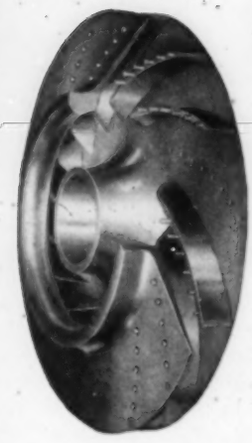
PLYWOOD GRAND RAPIDS, Grand Rapids, Mich.
PLYWOOD DAYTON, Dayton, Ohio
CLEVELAND PLYWOOD, Cleveland, Ohio
PLYWOOD TACOMA, Tacoma, Wash.
SAN FRANCISCO PLYWOOD, San Francisco, Cal.
PLYWOOD LOS ANGELES, Los Angeles, Cal.

AIR CONDITIONING REFRIGERATION



With Turbo Compressors



ONLY YORK HAS

Stainless Steel Impeller Wheels . . .

Available on no other compressor, yet they're standard equipment on York Turbos! Wheels constructed *entirely* of turbine quality stainless steel, corrosion-proof . . . and erosion resistant . . . assure years of operation at initial high efficiency.

ONLY YORK HAS

Pre-Rotation Vane Control . . .

Exclusive with York, a *gradual acting* multi-radial vaned control, constructed of accurately machined non-ferrous materials. Ring and pinion gear movement insures smooth vane opening and closing—multiple vanes give *precise adjustment* of refrigerant flow down to minimum capacities . . . impart a *flow pre-rotation*. Result—inherent *stability of operation* over the widest capacity ranges.

York gives you these 2 exclusive features at no extra cost. They put the York Turbo in a class by itself!

York Corporation, York, Pennsylvania.

YORK *Refrigeration and Air Conditioning*

HEADQUARTERS FOR MECHANICAL COOLING SINCE 1885

(*Continued from page 198*)

both a framed picture and a portable lighting device for use over beds, bookshelves, mantles and cabinets, or as a wall decoration. A plain sheet of acrylic plastic is engraved on the rear surface of the picture. When light is applied along the edge of the sheet, the path of light is interrupted by the engraved portions and thus brings out the design. By adding color and black to the back of the sheet, a 3-dimensional effect can be produced. Called *Decoralite*, this illuminated picture is described as opening new possibilities in the field of functional as well as decorative illumination by providing glareless room lighting. Lightolier Inc., 11 E. 36th St., New York, N. Y.

TEXTILE MILL HEATER

The *Textile Thermolier* is described as an answer to the requirements for a unit heater that can maintain its heat transfer capacity under the adverse operating conditions in textile mills with a minimum of cleaning maintenance. Replacing the conventional finned surfaces subject to rapid clogging are smooth contour heat transfer surfaces. Removing lint and dust is said to be completed in a few minutes with a jet of air from a compressed air hose or from a portable electric hand blower. A high volume of air delivery is designed to provide a partial self-cleaning action to maintain the heater's capacity for long operating periods.

Smooth heat transfer surfaces are said to reduce clogging of convector unit

The unit is offered in one size with a rating of 113,700 Btu per hour using steam at 2 lbs. pressure and entering air at 60° F. With steam at 25 lbs. pressure this same unit is said to deliver 143,400 Btu per hour. Any steam pressure up to 125 lb. can be used with corresponding increases in the heat transfer capacity. Grinnell Co., Inc., Providence, R. I.

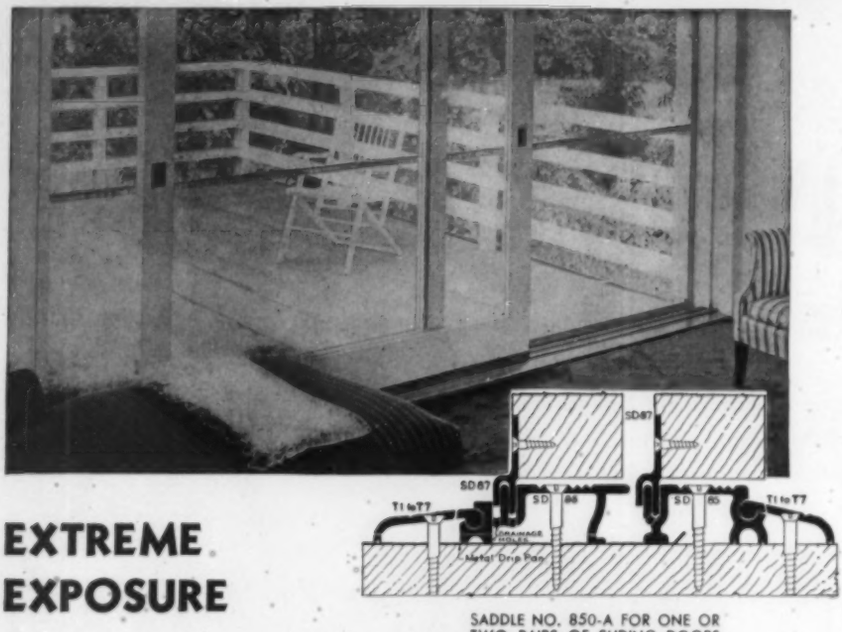
MEMO PAD

Pen or pencil notes are reported not easily lost if made on a new Vinylite plastic sheet writing pad. Notes are said to remain until erased by wiping the board with a cloth dipped in special remover fluid. The Vinylite board comes in a range of sizes and can also be used for preliminary sketches and layouts, conference and telephone pads and other office and school needs. Ruhl Development Co., 241 16th St., Toledo, Ohio.

PORCELAIN SINK

The new *Deluxe Porcelain Sink and Cabinet Unit*, recently introduced by the Tracy Customized Kitchens, includes a 54-in. double drainboard sink top in white porcelain enamel, crumb cup strainer and faucet with spray attachment. The unit is complete with a steel undersink cabinet with baked enamel finish, recessed center section, stainless steel handles, insulated doors and drawers, concealed ventilation, and storage space. Tracy Mfg. Co., Pittsburg, Pa.

WEATHER STRIPS FOR SLIDING DOORS



EXTREME EXPOSURE

SADDLE NO. 850-A FOR ONE OR TWO PAIRS OF SLIDING DOORS

But Thoroughly Weatherproof

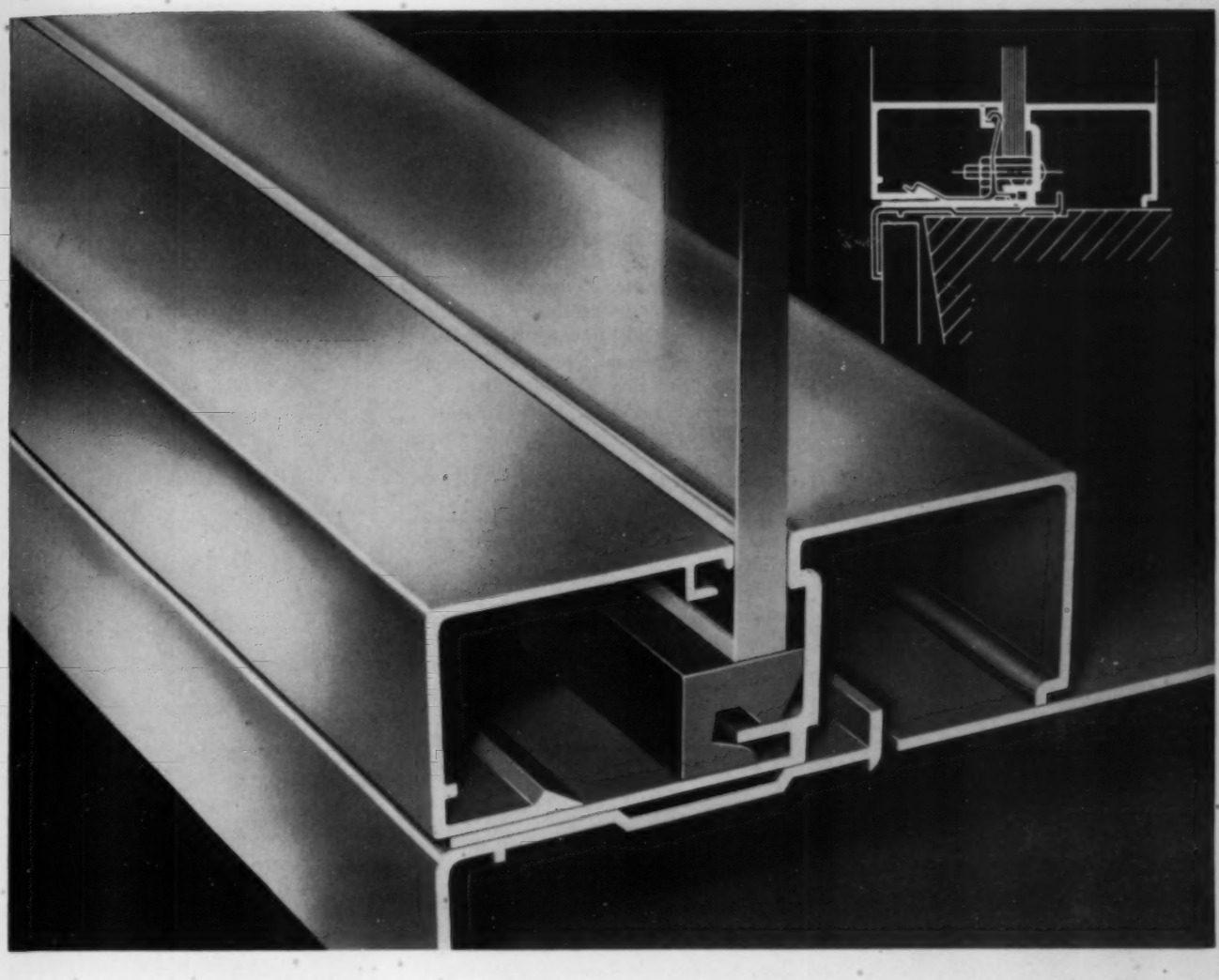
The above home, atop a high cliff, illustrates a wise use of Accurate Metal Weatherstrip for the sliding doors. For here, in the most inclement weather, rain or snow cannot beat its way in when the doors are closed. Nor can the smallest insects find their way through. The Accurate brass saddle for sliding doors has no substitute. It is another of the improvements pioneered and patented by the Accurate organization in the past 43 years to make windows and doors weatherproof.

WRITE FOR SPECIAL FOLDER

TRADE MARK ACCURATE REG. U.S. PAT. OFF.

ACCURATE METAL WEATHER STRIP CO., Inc.

215 East 26th STREET, NEW YORK 10, N. Y.



Another addition to the Pittco De Luxe line of Store Front Metal

● This double-faced rectangular sash (Pittco De Luxe 15C) was designed as a companion piece to Pittco's single-faced rectangular sash (12C). Both are extremely popular with architects who demand a plain surface, rich in tone and gloss, for certain modern store front designs.

This new sash is especially suitable for installations above the first floor level . . . the sash can be reversed so that necessary replacements can be made easily from inside. It can be used with any of Pittco's wide variety of De Luxe mouldings. And its strength and clear, sharp profiles are assured by its extruded method of manufacture.

Pittco De Luxe Store Front Metal is the ideal choice where highest quality is the prime consideration. Where quality and economy are of equal importance, specify Pittco Premier. The Premier line of Store Front Metal embodies the same perfection of finish as Pittco De Luxe, but it is lighter in weight and provides a shallower reveal for show windows.

PITTCO
STORE FRONT METAL

PPG

PAINTS • GLASS • CHEMICALS • BRUSHES • PLASTICS

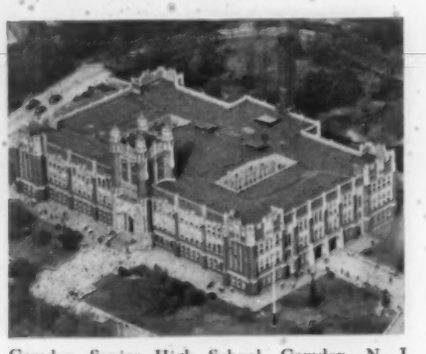
PITTSBURGH PLATE GLASS COMPANY

3 "Home Town" Schools Heated by Webster

In Camden, N. J., home town of the 60-year old Webster Organization, the Board of Education turned to Webster for solution of the diverse heating problems in both local high schools and one grammar school.

Heating plans for the Camden Board of Education are made by William T. Harker, of William T. Harker & Associates, Consulting Engineers, who says:

"Putting Camden-made Webster Moderator Systems in our schools is more than a matter of home-town pride. We have found that it pays to do so. Comfort is increased. Heating costs are low. Webster has the equipment and the experience to solve our heating problems."



Camden Senior High School, Camden, N. J. Built 1918. Heating modernized 1945 with Webster Moderator System.

In one case the high pressure boiler plant was converted to low pressure. In another, inoperative room temperature control was removed. In a third, noise was eliminated.

Modernization of obsolescent or worn mechanical plants pay off — equal and sometimes even greater results can be obtained in other public buildings, warehouses, hotels, office buildings, apartments.

Write us about your heating problems. A Webster Representative will be glad to discuss it with you.

Address Dept. AR-11

WARREN WEBSTER & CO.
Camden, N. J. : : Representatives In Principal Cities
In Canada, Darling Brothers, Limited, Montreal

Webster HEATING

ARCHITECTURAL ENGINEERING

TECHNICAL NEWS AND RESEARCH

(*Continued from page 154*)

Concrete

Trimix Makes Good Concrete Better. Folder describes the use of a multi-purpose liquid mixture which is said to simplify and speed the handling and placing of concrete, stucco and cement plaster and also to accelerate finishing operations and add to the strength and durability of completed structures. 6 pp., illus. Building Products Div., L. Sonneborn Sons, Inc., New York 11, N. Y.*

Domestic Water Heaters

Water Heating with L. P. Gas. Installation tips on how tempering tanks and smaller size water lines can save on water heating costs are included in this booklet. Other pages discuss how to select adequate water heater size, heater location and proper tank water temperature. Return circulating systems and special series installations are pictured. 16 pp., illus. Bryant Heater Co., 17825 St. Clair Ave., Cleveland 10, Ohio.*

Boilers

Scotch Boilers (Bulletin No. 8-B). Advantages, construction details and design features are discussed for a line of Scotch boilers ranging in capacity from 1,400 to 25,000 sq. ft. steam radiation. Ratings and dimensions are listed. 4 pp., illus. The Brownell Co., 430 N. Findlay St., Dayton 1, Ohio.

Vermiculite

Insulation and Lightweight Aggregates. New methods of construction made possible by the use of vermiculite are described, including such subjects as insulating fill, insulating concrete and plaster, and acoustical plaster. 8 pp. Zonolite Co., 135 S. LaSalle St., Chicago, Ill.

Stainless Steels

Forming of Austenitic Chromium-Nickel Stainless Steels. A new book compiled to give fabricators of metal equipment a better understanding of the adaptability of stainless steels to all modern forming processes. The book presents a detailed description of modern forming procedures as applied to chromium-nickel stainless steels and as practiced in the fabrication plants of the United States. The specific examples of forming techniques are supplemented by details of tool design and tool materials and data on lubricants, dimensions and consecutive steps in fabrication. 309 pp., illus. The International Nickel Co., Inc., 67 Wall St., New York 5, N. Y. *$4.00.*

(*Continued on page 204*)

Smooth, simple, streamlined beauty is one of the great features of the amazing new Touch-Plate switch...but it's only a by-product! Operating with a feather-touch on and off action, low voltage Touch-Plate switches require no conduits...allow for any combination of multiple controls at virtually the same cost as old-fashioned installations! Let us tell you the whole story....

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BEAUTY
SAFETY

Approved by Underwriters' Laboratories

THE RELAY DOES THE WORK!

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DISTRIBUTORS, INC.
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Give the protection of STEEL insulation to every type of building

No matter what type or size of structure you plan, you can insulate with Ferro-Therm — and provide the unique protection of reflective *steel* insulation:

Protection from Heat and Cold — Ferro-Therm Steel Insulation *reflects 90%–95% of all radiant heat.* In winter, it reflects heat *into* the building, saving up to 25% in fuel; in summer, it reflects heat *away* from the building, reducing inside temperatures 10° to 12°.

Protection from Moisture — Ferro-Therm does not absorb moisture, and thereby reduces the danger of rot to framing members.

Protection of a Fire Barrier — Ferro-Therm acts as an effective fire-barrier, because it is *all-steel* and is stapled securely in place.

Protection from Deterioration — Because it is a sheet of *steel* with a protective alloy coating, Ferro-Therm gives *lasting* insulating efficiency.

Give every building the protection that only steel insulation can provide, by installing Ferro-Therm in cold storage and fur storage plants, warehouses, locker plants, test chambers, multiple dwellings and prefabricated structures such as Butler buildings and Quonsets. Made of 38-gauge steel — thin, light and easy to install. Mail the coupon now for details.

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Architectural File

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